FEBRUARY 11, 1957

STEEL
The Metalworking Weekly

A PENTON PUBLICATION

A PROGRAM FOR MANAGEMENT
1957 . . . . No. 1

MANAGEMENT DEVELOPMENT

The Care and Feeding of the Junior Executive . . . page 93

✔ Fast Start for 200 Series . . . page 104

✔ Good Year Ahead for Forgings . . . page 137

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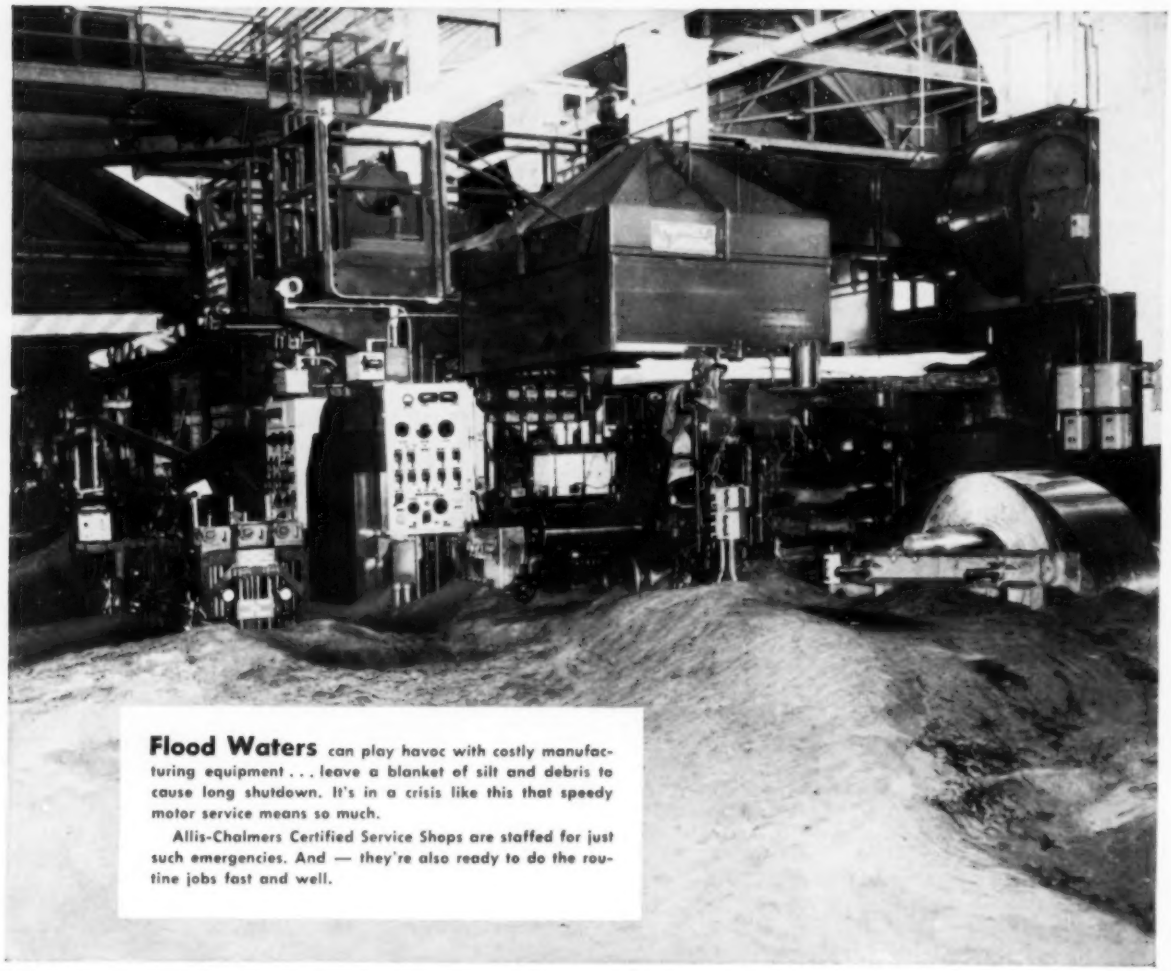
Allis-Chalmers "Certified" Service Shops:

When you need motor help



Flood Waters can play havoc with costly manufacturing equipment . . . leave a blanket of silt and debris to cause long shutdown. It's in a crisis like this that speedy motor service means so much.

Allis-Chalmers Certified Service Shops are staffed for just such emergencies. And — they're also ready to do the routine jobs fast and well.

Catastrophe or Routine Service

Whether it's complete catastrophe or a normal repair job, fast motor service can make a difference of thousands of dollars in lost production. As near as your phone is one of more than 100 Allis-Chalmers Certified Service Shops — ready to help save you production dollars.

These shops have manpower and equipment to perform repairs to Allis-Chalmers rigid standards. Their ability and integrity have been proven by years of service. They can do a good, fast job on any motor or generator, of any make. To locate the Shop in your area, call your nearby A-C district office, or write Allis-Chalmers, General Products Division, Milwaukee 1, Wis.

ALLIS-CHALMERS

A-C ALLIS-CHALMERS A-5300

10-Ton Mayari R Bucket Cleans Floor of San Francisco Bay

Set a clamshell bucket to work on the floor of San Francisco Bay, and you play hob with the bucket's longevity. Corrosion, abrasion and shock take a stiff toll of ordinary steels, and shove bucket-reconditioning costs up high.

The Olympian Dredging Company of San Francisco laid these problems on the table when they planned the construction of a new 7½-yd dredging bucket. The 10-ton clamshell shown above is the end product of their thinking.

The bucket was fabricated from 1½- and 2-in. plates of Mayari R high-strength, corrosion-resisting steel, with all wearing parts hard-faced for additional life. Although the bucket measures 7 ft wide by 9½ ft long, giving it 50 pct greater capacity than the Bay region average, its deadweight is moderate because Mayari R's high strength permits designing in lighter sections.

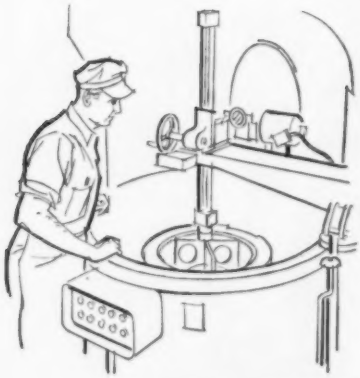
If you have a problem where resistance to corrosion or abrasion, weight-reduction or superior strength are critical matters, perhaps Mayari R would prove to be the practical, economical solution. Our Catalog 353 is full of just such examples in a wide variety of applications. A copy is readily available through the nearest Bethlehem office.

BETHLEHEM STEEL COMPANY, BETHLEHEM, PA.

On the Pacific Coast Bethlehem products are sold by Bethlehem Pacific Coast Steel Corporation. *Export Distributor:* Bethlehem Steel Export Corporation

Mayari R...High-Strength, Corrosion-Resisting Steel

BETHLEHEM STEEL



IH Saves $82,507 Per Year

with TOCCO Induction Hardening*

Gears, shafts, pins, wheels, tubes and bars—almost any size or shape of part—or any metal, too—is adaptable to TOCCO hardening, brazing, annealing or heating for forging.

Production Up—Engineers at the Milwaukee Works of International Harvester Company have adopted TOCCO for hardening final drive gears for famous International Harvester farm tractors. TOCCO increases production on the gear shown here from 14 to 35 per hour, 250% faster than conventional heating method, reduces job from a 3 shift to 2 shift operation, even with increased production schedule. Heating time is 35 seconds; oil quench, 60 seconds.

Costs Down—TOCCO cuts cost—saves $82,507 per year on application shown above. TOCCO makes possible use of C-1050 A.R.R. steel instead of expensive A-8645-H alloy steel previously required. TOCCO also eliminates shot-blast, formerly needed to remove scale, and extra machining operations that used to be necessary to compensate for distortion.

Gear shown is 18½″ O.D., width of face is 2″, weight 34 pounds, 73 teeth. Hardness obtained is 55-66 R.C., using 140 K.W. of 10,000 cycle power.

Our Engineers can probably find applications in your plant where TOCCO can increase output and reduce unit costs.

THE OHIO CRANKSHAFT COMPANY

Mail Coupon Today—**NEW FREE Bulletin**

The Ohio Crankshaft Co. • Dept. S-2, Cleveland 5, Ohio

Please send copy of "Typical Results of TOCCO Induction Hardening and Heat Treating".

Name_____

Position_____

Company_____

Address_____

City_____ Zone____ State_____

The same trucks that do the stacking also transport appliances from end of assembly line to storage, and from storage to loading docks. Two-way radio dispatch system expedites movement.

13 BAKER TRUCKS give General Electric Appliance Park "floor-to-ceiling" utilization of warehouse space!

Every cubic foot of storage space in this mammoth appliance warehouse is utilized by compact stacking. Baker Trucks, equipped with a special lift attachment that handles cartons or crates without forks, help do the job.

General Electric has a fleet of 13 such trucks at this installation and is adding 5 more. This new concept in appliance handling completely eliminates the use of pallets—which would have meant an additional investment 8 or 9 times the cost of the trucks. The absence of forks and pallets makes possible stacking one tier higher and reduces aisle space required, thus increasing storage capacity more than 25%.

The trucks have a total lift of 242 inches. Appliances are handled 4 per load for the bottom 2 tiers, and 2 per load for upper tiers. Gravity sliding back-rest aligns loads perfectly with tiers below and protects them from impact damage. Side-shifter butts loads snugly against adjacent stack for lateral alignment.

A Baker handling engineer can help you devise similar cost-saving methods in your plant or warehouse. Call your nearest Baker representative or write us direct.

Baker industrial trucks

THE BAKER-RAULANG COMPANY

1259 WEST 80th STREET • CLEVELAND 2, OHIO

A Subsidiary of Otis Elevator Company

Otis

6E-6

THE

A B C

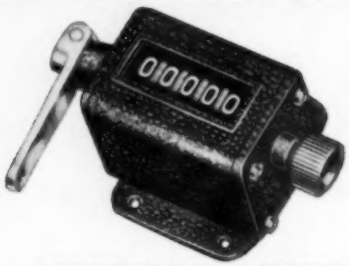
OF

1 2 3

Why is COUNTROL

important in every business today?

Countless times a day, every business needs to know "how many? . . . how much? . . . how far? . . ." and many other questions that can be answered only by facts-in-figures. But how to get these figures . . . from so many different machines, processes, operations and systems? Veeder-Root Counters are doing it every day, by means of:



MECHANICAL COUNTING

Small Resets count strokes, turns, or pieces . . . are used by thousands for moderate duty in parts inspection, quality control, conveyors, machine tools, light presses, etc.

HAND COUNTING

Where objects or units cannot be counted electrically or mechanically, hand-operated counters like this Hand Tally do the job. For instance, quick spot checks of production or performance, traffic count, inventory, etc. Fits palm of hand, counts one for each pressure of thumb lever, resets to zero by turning knob.

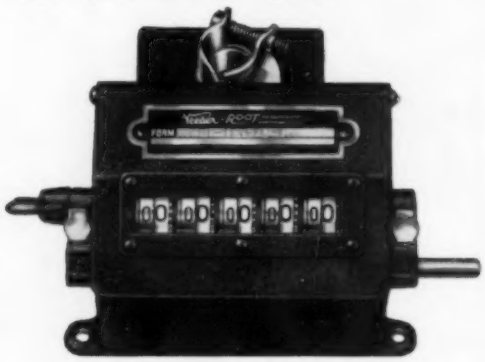
Insist on Standard

VEEDER-ROOT COUNTERS

from your Industrial Supply Distributor

ELECTRICAL COUNTING

These remote-indicating counters bring your production machines as close as your office wall. AC or DC, they can be connected in series with any simple switch, and will transmit production figures *instantly* over any distance. May be panel-mounted in groups.



CONTROLLING

Set it for the exact number of turns, pieces, or operations required . . . and this Predetermining Counter will control the run *exactly* . . . preventing over-runs and shortages. When the predetermined number is reached, counter will light a light, ring a bell, or actuate a stop-motion.

IN SUM: *If it can be counted or controlled . . . count on Veeder-Root to do it. Get in touch with your Industrial Supply Distributor for standard counters for application to your production machines and processes. And get in touch with Veeder-Root for counters to be built into original equipment.* **Veeder-Root Inc., Hartford 2, Connecticut.**

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PLANT LOCATION FACTS

Pin-pointing your markets . . . present and potential

New York State is the world's greatest market. And it is adjacent to other major markets.

If being close to your markets is a major factor in your plant site analysis, you will want complete marketing facts on which to base your locational decision. Supplying such facts is our business.

For consumer goods, we will provide the data with which you can appraise markets that can be reached competitively from any specific location in New York State. If your customers are industrial, we will provide you with summaries of types, size and distribution of the industries in which you are interested within the New York State marketing area.

Markets won't be your only problem in deciding on a new plant location. You will want complete facts on labor, water, available sites or buildings, power, fuel, transportation and raw materials. And you will want information on these as they apply to the successful operation of a specific plant.

A tailor-made report

Any or all of the factors important to your consideration will be covered in a confidential report to you—tailored to your needs. It will be prepared by a professional and experienced staff to cover either New York State locations of your choice, or, if you wish, sites which we will select on the basis of your needs.

Our booklet, "Industrial Location Services," explains what we can do for you. To get your free copy, write me at the New York State Department of Commerce, Room 67¼, 112 State Street, Albany 7, N. Y.

Edward T. Dickinson

EDWARD T. DICKINSON
COMMISSIONER OF COMMERCE

behind the scenes

Hold That (Executive) Line

After Grandpappy came out of the hills and took a regular job, he put on airs and bought a pair of shoes. Naturally, they pinched his large, lumpy feet, but he declared philosophically: "These are problems that come with prosperity, but I'll just take them in stride."

Metalworking's fabulous future is closing in on us fast, but many of the problems it is bringing with it cannot be taken in stride: Work must be done on them now. One of the most pressing is the care and feeding of junior executives. Copy Editor Harry Chandler addressed himself to this problem and traveled far and wide questioning selected management. While he was in New York verifying statistics suggesting that today's junior executive is tomorrow's big shot, his wife became a mother in Cleveland . . . and we submit that when a man devotes that much attention to a story, it better be a humdinger (see page 93).

Well, it is. It examines the reasons behind the short supply of junior executives, outlines a management development program and explains the importance of grooming young management personnel *now*.

Bright young men should read this article, too. They are in short supply—and although the rascals know it, it will be helpful for them to study what senior management is planning for them.

STEEL Draws a Pair

It is widely known, of course, that Opelika, Ala., is merely 30 miles from Goat Rock Dam on the Chattahoochee River and has a population of something over 12,000, but now it has a newer claim to fame: One of its former high school boys, Horace L. Samford, has been appointed an assistant editor on STEEL. Horace (naturally, he's called Sam, but we can't pass up the opportunity to add a little class to this page; for instance, how many Horaces do you know?) was graduated from Oglethorpe University, was city editor of the *Nashville Tennessean*, then served as a captain in the U.S. Army Air Force. More recently, he was a reporter for the *Cleveland Plain Dealer* and the *Cleveland News*. There's a whisper of red earth and turpentine in Horace's speech even yet, but it sounds right purty.

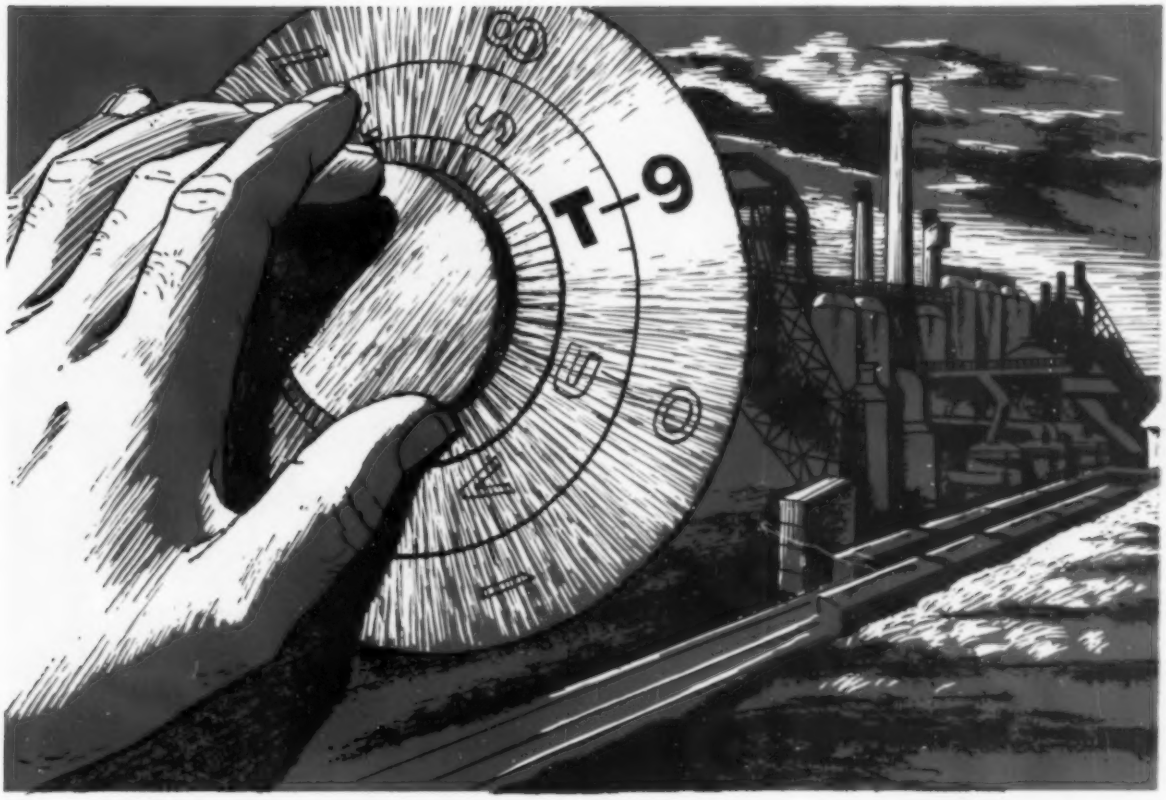
Another young gentleman joins STEEL this week as an assistant editor: Harold Bryan Wilson. Harold was graduated from the University of West Virginia, worked on the copy desk of the *Parkersburg Sentinel*, served a year's hitch as a journalist seaman and came to Cleveland as editor of *Pest Control*, a trade journal devoted, as the title indicates, to the control of pests. We were tempted to inquire further into the editorial duties of the director of that fascinating journal, but held back when we noticed that our space was running out. This week's puzzle is a lulu, and we want to give it room.

This May Get Your Goat

First, the force of the tide was ¾-mph. Now let's go to Peru. In the town of Lloraporleche, goat milk sells for 25 cents a quart. Each week $378 worth is sold there for drinking purposes; the excess is sold outside the village. Everyone who is able to, drinks exactly one quart of goat's milk per day. No goat owner buys milk. No one raises hay unless he is a goat owner, but not all goat owners raise hay. No hay raiser is able to drink goat's milk. Twenty-five per cent of the people own 75 per cent of the goats, each of which produces 2 quarts of milk per day, and 37½ per cent of the goat owners raise 75 per cent of the hay, while 75 per cent of the people drink 37½ per cent of the milk produced. The people never own more than three goats apiece; and 50 per cent own no goats at all; and only 25 per cent of the people owning under three goats apiece raise hay. How many people in Lloraporleche take in more than $2 gross a week from the sale of goat's milk?

Shrdlu

(Metalworking Outlook—Page 47)



THE RIGHT COMBINATION:

T-9 Plus Complete Engineering Plus Installation Assistance

Like Steel — pioneering in special alloys to meet specific requirements — the Mexico Refractories Company, too, continues persistent pioneering in the Special Plastic Refractory field.

High quality standards are recognized as "every-day" procedure in American industry — and so it is at Mex-R-Co where quality standards are so high in the production of Plastic Refractory products that our customers refer to them as "Idealistic."

Such a product is MONO T-9 — a special Super-duty Plastic Firebrick EQUAL TO HIGH-BURNED SUPER-DUTY CLAY-BRICK for lining Steel Industry Furnaces, such as:

- SLAB HEATERS
- SOAKING PIT COVERS
- HEAT TREATING FURNACES
- FORGE FURNACES
- BURNER PORTS
- IRON LADLES
- REGENERATOR ROOFS — FANTAILS — NOSES

MONO T-9 is so unique in application that we prefer to treat each job individually, because we feel each job merits custom engineering to fit particular plant conditions.

May we have your prints so we can present a lay-out and discuss with you the application of MONO T-9 to your furnace enclosures.

Another First—T-9 is packaged in "Poly-Wrap" TO STAY FRESH

FREE: (For your Technical File) Complete physical and chemical properties and technical details on MONO T-9 will be gladly sent you upon request.

MEX-R-CO

119

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MEXICO, MISSOURI

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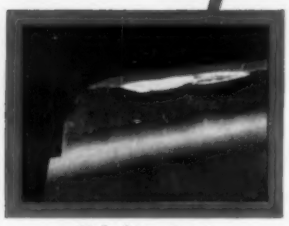
RED RING
HARD GEAR HONING
PRODUCES QUIET GEARS



Nicked Gear Tooth

Same Gear Tooth After Honing

Hard gear tooth honing is an entirely new approach to the vexing problem of intolerable gear noise arising from nicks, burrs, tooth roughness and minor heat-treat distortions.

Honing is not only far more effective than other processes used to combat gear noise but it is also much more economical. And it produces none of the undesirable after effects inherent in other processes such as heat checks, soft skin or residual stresses in the tooth metal.

Gear honing does four important things:

- Smooths off the swaged or raised metal surrounding tooth nicks.
- Eliminates burrs.
- Materially improves surface finish.
- Corrects minor heat-treat distortions in profile, index and lead.

When used as a final routine finishing operation following heat-treat, it eliminates the tedious and costly operation of searching for nicks and then correcting them. It improves the quality, uniformity and performance of all gears produced.

SPUR AND HELICAL GEAR SPECIALISTS
ORIGINATORS OF ROTARY SHAVING AND ELLIPTOID TOOTH FORM

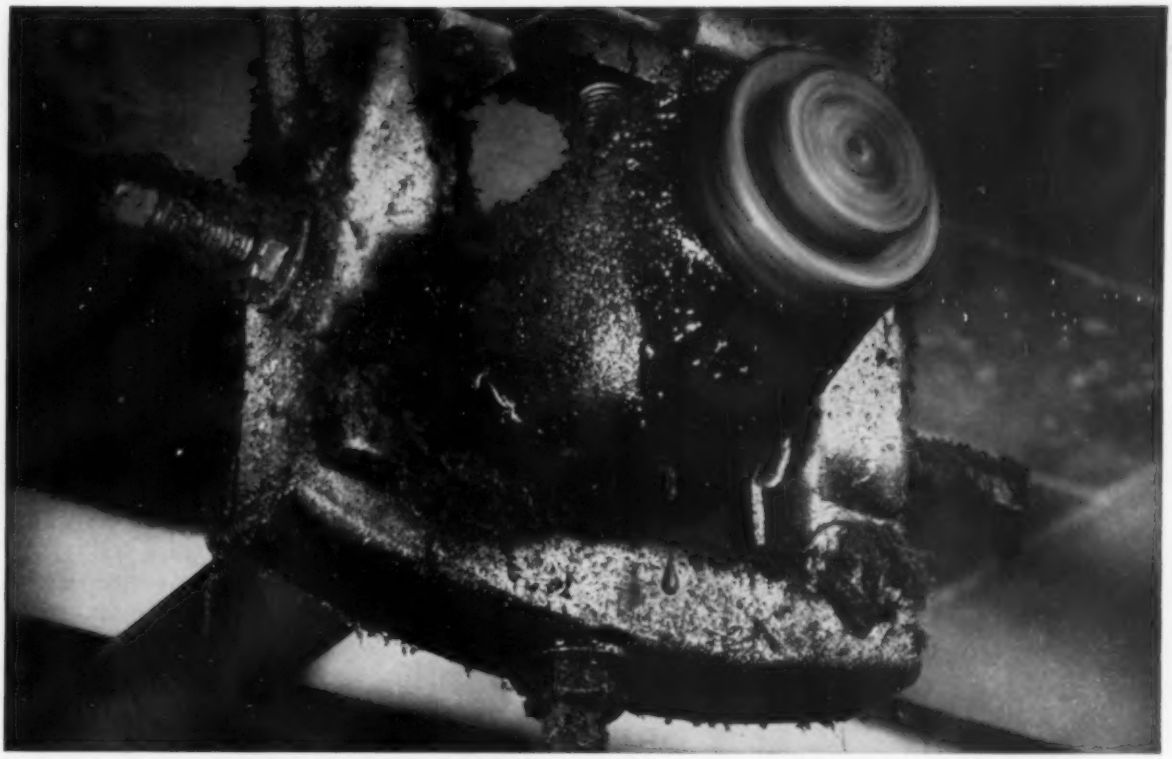
NATIONAL BROACH & MACHINE CO.

5600 ST. JEAN • DETROIT 13, MICHIGAN

WORLD'S LARGEST PRODUCER OF GEAR SHAVING EQUIPMENT

Patents pending

7631



IT'S EASY to reduce annoying and expensive oil leakage like that shown here. The simple act of switching to a Suntac oil – *without making any other changes* – can cut leakage an average of 35%...sometimes 90%!

SUNTAC STOPS SHUTDOWN CAUSED BY OIL LEAKAGE

A manufacturer was having trouble with oil leakage and throw-off from bearings of overhead shafting. This resulted in hazardous conditions and low employee morale. Production had to be shut down frequently. Oil costs were high.

A switch to a Suntac® lubricating oil solved these problems.

If you're losing oil through excessive leakage from rotating or sliding parts, a Suntac oil can cut your consumption an average of 35%. These oils are especially compounded to reduce drip, throw-off, squeeze-out; their greater adhesiveness enables them to cling firmly to the parts...as they lubricate.

Suntac oils can reduce consumption up to 90% when used in hydraulic systems, circulating systems, and in other continuous use applications.

For further information on versatile Suntac oils, see your Sun representative or write SUN OIL COMPANY, Philadelphia 3, Pa., Dept. S-2.

SUNOCO

INDUSTRIAL PRODUCTS DEPARTMENT

SUN OIL COMPANY Philadelphia 3, Pa.

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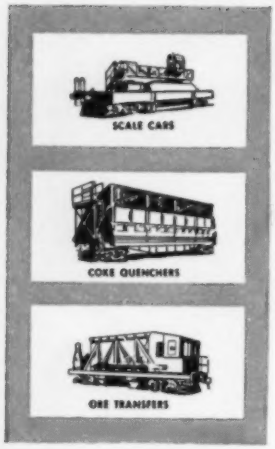
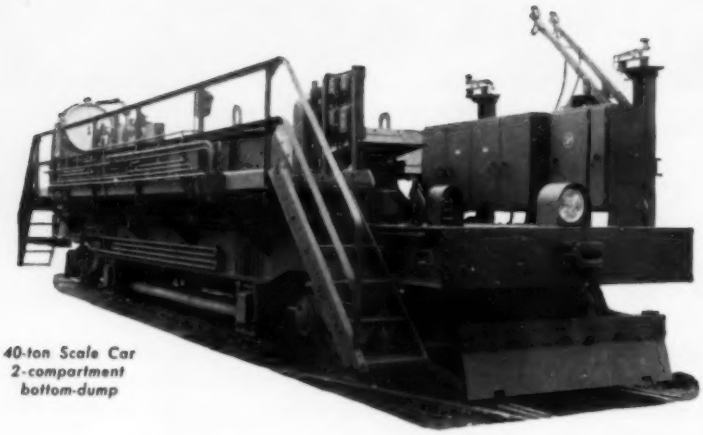


why is ATLAS preferred?



40-ton Scale Car 2-compartment bottom-dump

The dependability of Atlas cars is such that a number of blast furnaces are operating their Atlas scale cars without a spare car.

THE ATLAS CAR & MFG. CO.

1100 Ivanhoe Rd. • Cleveland 10, Ohio

Since 1896

LETTERS TO THE EDITORS

Tops Other Magazines

. . . I would also like to congratulate you on your fine magazine. Of all the industrial magazines we receive, I get more information from yours than all the rest.

Mrs. Marion G. Reisner
Adams Co.
Dubuque, Iowa

Docile Machine Tools

In the Jan. 21 issue, I came across the interesting article, "Machines That Obey Orders" (Jan. 21, page 68). Would you be kind enough to send an extra copy?

Frank G. Schubert
Chief Industrial Engineer
Ditto Inc.
Chicago

Solve Skilled Labor Shortage

Please send two copies of your article, "Primer for In-Plant Training" (Jan. 28, page 68).

Your publication is excellent and has proven helpful and informative on many occasions.

E. J. Rice
Plant Superintendent
Johnson Service Co.
Milwaukee

Best for Many a Moon

I would like eight copies of the article, "Check Your Territories" (Jan. 21, page 40). I believe it is one of the best and most up-to-date articles I have read for many a moon.

Frank Pavlicek
President
Sanymetal Products Co. Inc.
Cleveland

Appreciates STEEL's Effort

Your article, "Resistance Welding Gains" (Jan. 14, page 40), is well written. I, for one, appreciate your efforts to acquaint users with resistance welding facilities and know-how.

David V. Uihlein
President
Banner Welder Inc.
Milwaukee

Metallic Zinc Purity Data

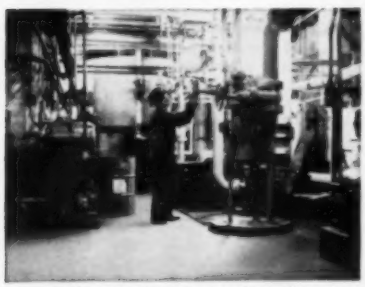
The knowing reader will recognize what has happened, but I must call your attention to a small error in my contribution (page 251) to your Forum on Technical Progress in the Jan. 7 Yearbook issue.

The statement says: This is conjecture . . . diecasting of zinc was not

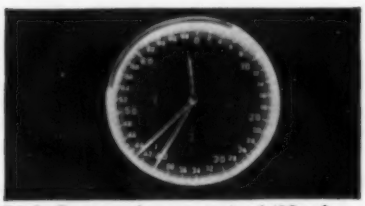
(Please turn to page 12)

Time exposure shows continuous motion of red-hot ingot as it travels through roller.

"Never replaced screwdown or nut using Cities Service E. P. Lubricants!"



Circulating System located on floor below mill, uses Cities Service E. P. Oils. Mill operates 160 hours a week, has never had lubrication failure.



Dial Gauges Accuracy to 1/32 of an inch. It is used by operators in the pulpit, who control the mill's 7000 horsepower and shape its steel to unusually fine tolerances for a blooming operation.

Ever since the installation of this blooming-slabbing mill at Pittsburgh Steel Company's Monessen Works, Cities Service E. P. Oils have been used for lubrication.

During that time, over 4,000,000 tons of steel have been run through the mill's huge rolls . . . but never once has the firm found it necessary to replace the screwdown, nut or any bearing due to lubrication failure.

A Pittsburgh Lubrication Engineer says: "Oils stay with the parts that must be lubricated and never give us a problem."

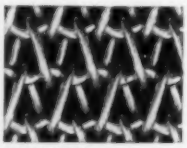
Where an inferior lubricant might be wiped away during the regular operation of the mill, Cities Service E. P. Oil withstands continuous operation. In addition, the oil can be centrifuged and yet not lose its additive.

Pittsburgh Steel is one of an increasing number of steel manufacturers who report outstanding results with Cities Service Lubricants. A Cities Service Lubrication Engineer will be happy to supply all the reasons. Or, if you prefer, write Cities Service Oil Company, Sixty Wall Tower, New York 5, New York.

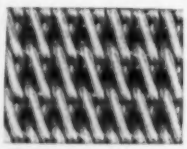
CITIES SERVICE

QUALITY PETROLEUM PRODUCTS

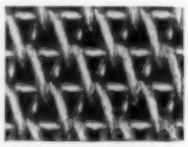
How to select WOVEN WIRE CONVEYOR BELTS for Continuous HEAT TREATING



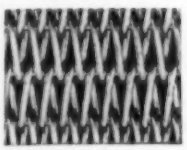
BALANCED—High tensile strength, low ultimate cost belting for operation up to 1300°F. Resists distortion. Designed for straight travel.



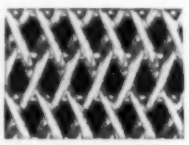
DUPLEX—Compact structure of great density provides high tensile strength, while close mesh provides smooth surface for carrying small parts.



ROD-REINFORCED—Highest tensile strength and low thermal capacity. Recommended for high temperature work, up to 2100°F. Undergoes minimum elongation and width contraction.



GRATEX—Close spirals retain the advantages of Balanced weave, while adding strength. For cold, medium and some high temperature applications.



DOUBLE BALANCED—A widely used weave combining open mesh of Balanced Weave with the strength of Gratex. For cold, medium and some high temperature applications.

As you know, woven wire conveyor belts are widely used for combining movement with processing in many continuous metalworking operations—brazing, annealing, sintering, quenching, tempering, washing, etc. Heat treaters, particularly, find that in all phases of their operations, belt-to-belt flow through processing eliminates manual handling, increases production efficiency and product uniformity.

However, there is no single type of belt construction suitable for all operations. Some must withstand the rigors of higher temperature service—up to 2100°F.; some require fine mesh for handling small parts; others must resist the corrosive attack of pickling processes and cooling operations. That's why Cambridge has nine basic weaves available in any metal or alloy. The five shown here are the most widely used in the metalworking industry.

There are several factors that generally influence selection of weave, mesh size and metal or alloy from which the belt will be woven. Among them are: size and shape of the parts to be handled, temperatures to which belt will be subjected, presence of wet or corrosive conditions. Even after these have been decided, overall belt construction must be designed to meet individual requirements—type of drive, selvage, support and special surface attachments must be selected.

You can see, then, that designing for continuous processing with woven wire conveyor belts is not a simple "nuts and bolts" job. Ramifications build up rapidly to demand the service of a specialist. That's why Cambridge maintains a staff of competent Field Engineers to help you select the Woven Wire Conveyor Belt to make your installation most efficient. You can rely on the experience of these engineers to specify just the right belt for you. In addition, they are thoroughly familiar with basic conveyor design. For the name of your nearest Cambridge Field Engineer, look under "Belting, Mechanical" in your classified telephone book. Or, write direct. Also ask for Special Report, "6 WAYS to Increase HEAT TREATING PRODUCTION", and 130-page Reference Manual of specifications and design information. THE CAMBRIDGE WIRE CLOTH CO., DEPARTMENT J, CAMBRIDGE 2, MD.

LETTERS

(Concluded from page 10)

practical until 99.999 per cent pure metal becomes available.

The percentage in this case should have been 99.99 per cent (4 nines, not 5).

J. L. Kimberley
Executive Vice President
American Zinc Institute Inc.
New York

Request for Yearbook Trio

I will appreciate receiving one copy each of the articles, "Get Set for Metalworking's Fabulous Future" (page 123) and "What Metalworking Management Expects in 1957" (page 127), from your Jan. 7 issue.

Is it possible to secure a copy of the ninth annual edition of "Facts and Figures of the Metalworking Industry" which is also in this issue (page 167)? It makes excellent reference material.

Richard R. Breneman
Asst. General Traffic Manager
Wheeling Steel Corp.
Wheeling, W. Va.

Reading That Inspires

I finished reading your article, "Let Traffic Managers Manage" (Nov. 26, page 68) and find it inspiring. Please send an extra copy.

Ralph C. Wilgus
Traffic Manager
Carrier Corp.
Syracuse, N.Y.

Used in Sales Office

Your article, "Cold Heading Branches Out" (Jan. 14, page 71), was excellent. I would appreciate five copies, or whatever you can spare, for my use here in the Detroit office.

J. L. Eichenlaub
Division Sales Manager
Brainard Rivet Co.
Birmingham, Mich.

Thank you for the 15 extra copies of this excellent article. It will be helpful to our salesmen.

Frank J. Smith
Vice President-Marketing
Columbus Bolt & Forging Co
Columbus, O.

Future Company Executives

Have just read with interest your Dec. 31 issue. Would you please forward a copy of the article, "What Is a Manager?" (page 30), which includes a word portrait of today's executive.

A. C. Angelos
Superintendent of Engineering Services
Farnsworth Electronics Co.
Ft. Wayne, Ind.

Cranes of Aluminum

The Jan. 14 issue of STEEL carried an article, "Kaiser's New Cranes Are Aluminum" (page 88). May I have an extra copy?

To whom should I address a letter of inquiry about Kaiser's No. 5083 alloy? I would like to know more about its structural strength and available sizes and shapes.

T. O. Davidson
Chief Planning Engineer
Wolverine Tube
Division of Calumet & Hecla Inc.
Decatur, Ala.

● *Contact Dudley T. Ross, Head, Press Section, Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif.*

DoALL
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IN 55 MINUTES
Here is one of 25 pieces being accurately cut to within .002" per inch at 10 sq. in. per minute with one DoALL Demon HSS Blade on the:
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High-speed steel band cuts faster—lasts longer. DoALL Band Mill cuts fast to accomplish rough machining in shortest possible time, removes whole section from work piece in single pass.

New Speed, Accuracy and Economy in Cutting Heavy Dies, Forgings, Plate, Castings

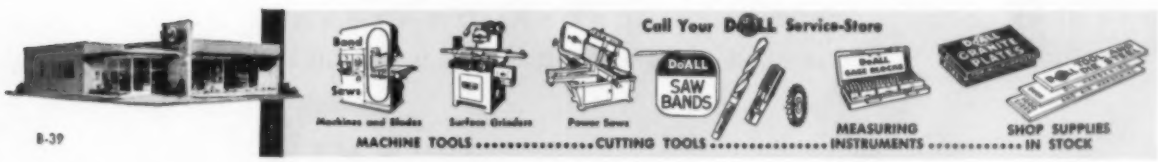
This new machine with positive table feed control brings the speed and economy of straight line metal parting with Demon HSS blades to the big jobs. Refacing or shanking heavy forging die blocks, ripping heavy plate and trimming heavy castings are only a few of the increasingly tougher, heavier cutting jobs you can do in a fraction of the time—*at a fraction of the cost* required with heavy, costly planers, shapers or milling machines.

You get big material savings, too. The DoALL Model 26-5 Band Mill removes entire usable sections of metal instead of reducing it to a pile of worthless chips.

Steel tired band wheels permit heavy tensioning of a rugged new 2" wide Demon HSS band. A powerful, smooth 40" stroke, automatic screw feed table on hand scraped, lubricated ways carries the work into the continuous-cutting band.

Here truly is the economy of band machining at its most efficient best—made possible by DoALL Band Machine engineering and DoALL's exclusive development of Demon blade, a heavy duty safety band tool of high-speed steel. The cutting speed and efficiency pictured above is just a sample of what your DoALL Engineer can show you about this dramatic new bargain in machine tools. Call him today or write for bulletin: **The DoALL Company, Des Plaines, Ill.**

DoALL *For Lowest Cost . . . do it on a DoALL!*



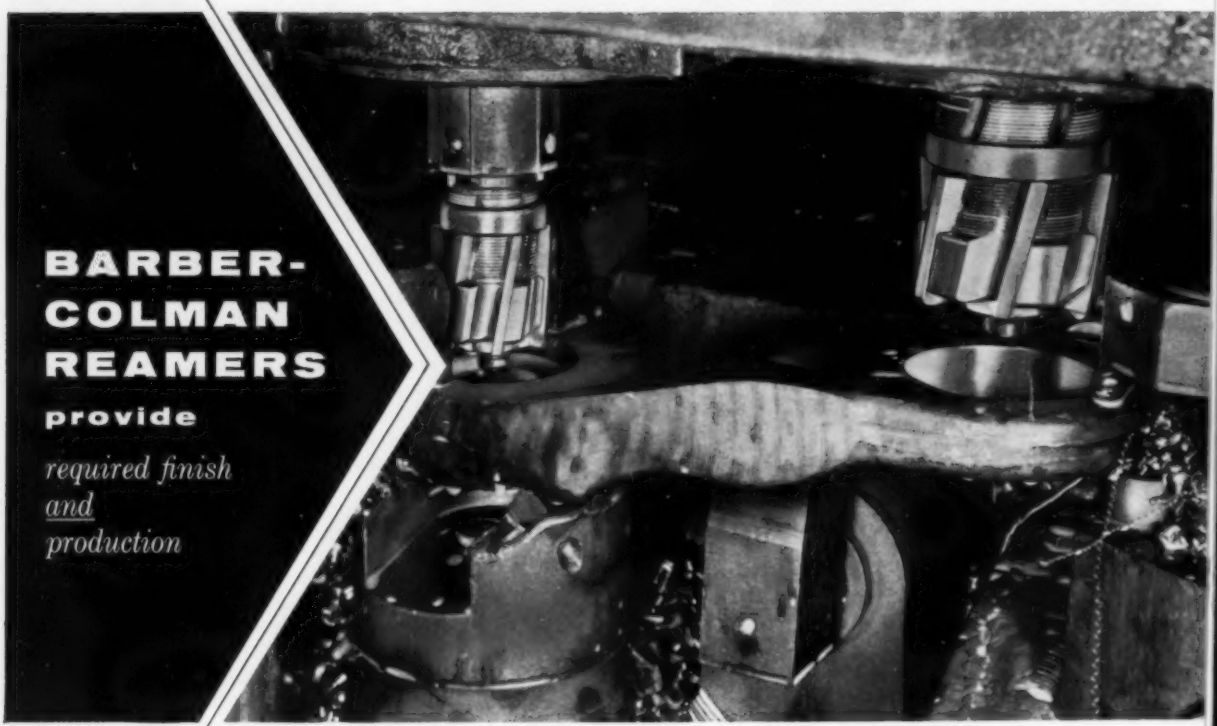
CATERPILLAR

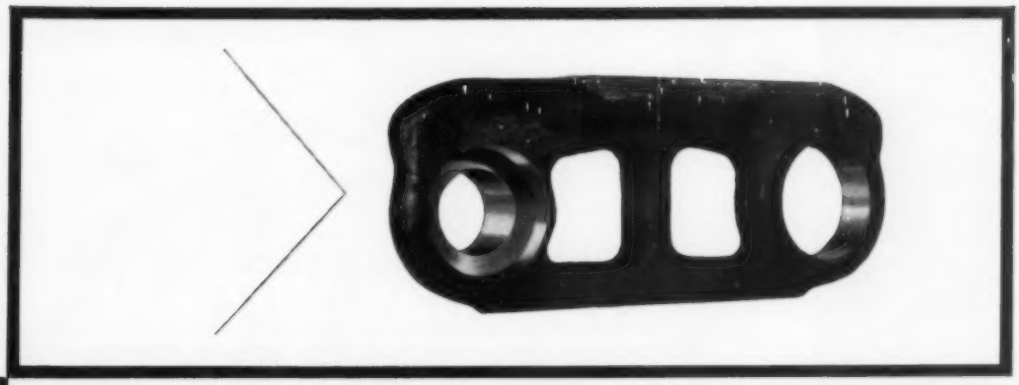
proves...

good reamer design helps hold size

and

tool life in tough materials





Caterpillar Tractor Co. finish reams 2 holes in these tough forged steel track links with the required surface finish and a production rate of 102 pieces per hour from each machine. Previous operations include core drill and rough ream the large hole, and core drill and counterbore the small hole. Four hundred pieces are obtained per sharpening in this tough, hard material. Finish reaming is used because it is the only means available which will produce the required finish and meet the high production requirements of this job.

these are the job facts:

Bore Size	2.605"	1.738"
Stock Reamed	.025"	.025"
Cutting Speed	75 rpm.	100 rpm.
Production	102 per hr.	102 per hr.
Feed	.011" per rev.	.013" per rev.

These Barber-Colman reamers were specially designed to suit the requirements of this part. The design of the reamer body provides maximum backing for the cutting edge and a large chip space in front of the blades to insure good chip flow.

The direction and angle of spiral are designed to provide the most efficient cutting action in this material. The reamer body is specially heat treated for toughness. These reamers are sharpened with a positive primary clearance. The nose form includes a chamfer, lead, and straight portion which are specifically designed for the job. Behind the nose, a back taper provides adequate clearance in the finished hole. These elements of the profile are accurately maintained by cam-controlled sharpening on the Barber-Colman Combination Sharpening Machine.

When you have hole finishing problems involving accuracy, finish, tool life and production requirements, call a Barber-Colman reaming expert and talk over with him the most economical way to get the results you want.

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The American Cancer Society says that too many people die of it, NEEDLESSLY: That's why I have an annual medical checkup however well I feel. I know the seven danger signals. And when I want sound information, I get it from my Unit of the

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CALENDAR
OF MEETINGS

Feb. 11-13, Drop Forging Association: Winter meeting and exhibit, Edgewater Beach hotel, Chicago. Association's address: 419 S. Walnut St., Lansing 33, Mich. Secretary-treasurer: Richard Marcus.

Feb. 13-15, American Management Association: Mid-winter, personnel conference, Palmer House, Chicago. Association's address: 1515 Broadway, New York 36, N.Y. Secretary: Andrew P. Donovan.

Feb. 14-15, Eastern States Blast Furnace & Coke Oven Association: Annual winter meeting, Penn-Sheraton hotel, Pittsburgh. Information: C. L. Potter, Jones & Laughlin Steel Corp., 3 Gateway Center, Pittsburgh 20, Pa.

Feb. 24-28, American Institute of Mining, Metallurgical & Petroleum Engineers: Annual meeting, Roosevelt and Jung hotels, New Orleans. Institute's address: 29 W. 39th St., New York 18, N.Y. Secretary: E. O. Kirkendall.

Feb. 25-27, American Management Association: Annual special conference on electronics, Hotel Statler, New York. Association's address: 1515 Broadway, New York 36, N.Y. Secretary: Andrew P. Donovan.

Feb. 25-Mar. 1, International Heating & Air-Conditioning Exposition: International Amphitheatre, Chicago. Information: International Exposition Co., 480 Lexington Ave., New York 17, N.Y. President: E. K. Stevens.

Mar. 5-7, American Machine Tool Distributors Association: Spring meeting, El Mirador hotel, Palm Springs, Calif. Association's address: 1900 Arch St., Philadelphia 3, Pa. General manager: James C. Kelley.

Mar. 5-7, Society of Automotive Engineers Inc.: National passenger car, body and materials meeting, Sheraton-Cadillac hotel, Detroit. Society's address: 485 Lexington Ave., New York 17, N.Y. Secretary: John A. C. Warner.

Mar. 6-8, Pressed Metal Institute: Annual spring technical meeting, Carter hotel, Cleveland. Institute's address: 3673 Lee Rd., Cleveland 20, O. Managing director: H. A. Daschner.

Mar. 10-13, National Association of Waste Material Dealers Inc.: Annual convention, Conrad Hilton hotel, Chicago. Association's address: 271 Madison Ave., New York 16, N.Y. Managing director: Clinton M. White.

Mar. 11-15, National Association of Manufacturers: Institute on industrial relations, Holly Beach hotel, Hollywood, Fla. Association's address: 2 E. 49th St., New York 17, N.Y. Information: Sybyl S. Patterson, associate director, Industrial Relations Division, National Association of Manufacturers.

Mar. 11-15, 1957 Nuclear Congress: Convention Hall, Philadelphia. Co-ordinator: Engineers Joint Council, 29 W. 39th St., New York 18, N.Y.

Mar. 13-15, National Fluid Power Association: Annual meeting, Hollywood Beach hotel, Hollywood, Fla. Association's address: 1618 Orrington Ave., Evanston, Ill. Executive secretary: Barrett Rogers.

Mar. 13-15, Radio-Electronics-Television Manufacturers Association: Spring meeting, Sheraton Park hotel, Washington. Association's address: 777 14th St. N.W., Washington 5, D.C. Secretary: James D. Secrest.

Mar. 14-15, National Industrial Conference Board: Atomic energy conference, Benjamin Franklin hotel, Philadelphia. Board's address: 460 Park Ave., New York 22, N.Y. Secretary: Herbert S. Briggs.

Mar. 17-19, Steel Founders' Society of America: Annual meeting, Drake hotel, Chicago. Society's address: 606 Terminal Tower, Cleveland 13, O. Secretary: George E. Dreher.

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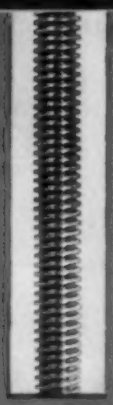
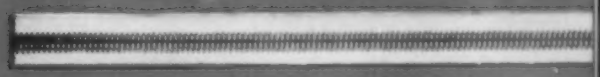
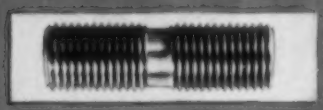
Additional information on request—please send specifications and ask for Bulletin E-60.



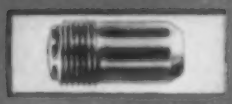
WORKPIECE: Jack Screw
MATERIAL: C1018 Steel
THREAD SPECIFICATIONS: 1"-5 pitch 29° Acme
TOLERANCE: Class 4C
METHOD: Thrufeed Rolling
PRODUCTION: 30" per minute (rolled in 36" lengths—can be rolled in 12" lengths)



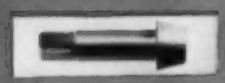
WORKPIECE: Timer Switch Leadscrew
MATERIAL: B1112 and C1117 Steel
THREAD SPECIFICATIONS: ¼"-16 Pitch Standard Acme
TOLERANCE: Class 3G
METHOD: Thrufeed Rolling
PRODUCTION: 46" per minute (rolled in 18" lengths—can be rolled in 12' lengths)



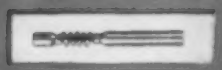
WORKPIECE: Double-End Stud
MATERIAL: C1040 and SAE 8620 Steel
THREAD SPECIFICATIONS: 2"-4½ pitch NC—3" thread length
TOLERANCE: Class 3
METHOD: Infeed Rolling (manual loading)
PRODUCTION: 1½ min. rolling time per piece (both ends)



WORKPIECE: Barrel—MG Gun Perforator
MATERIAL: .60 Carb. Silicon Tool Stl.
THREAD SPECIFICATIONS: 1⅛"-6 pitch Stub-Acme—1" thread length
TOLERANCE: Class 3G
METHOD: Infeed Rolling (hand-operated work-holding fixture)
PRODUCTION: 15 pieces per minute



WORKPIECE: Aircraft Bolt
MATERIAL: 4340 Steel of 36-40 Rockwell C
THREAD SPECIFICATIONS: 1"-14 pitch NF—1-5/16" thread length
TOLERANCE: Class 3A (Military Spec. MIL-S-7838-A)
METHOD: Infeed Rolling (manual loading)
PRODUCTION: 10 pieces per minute



WORKPIECE: Transfer Drive Worm
MATERIAL: Stainless Steel
THREAD SPECIFICATIONS: ¼"-26 diametral pitch, left-hand, single—⅜" thread length
TOLERANCE: .1825—.1805 P.D.
METHOD: Infeed Rolling (manual loading)
PRODUCTION: 20 pieces per minute

LANDIS Machine COMPANY

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Good News Norgren

for design engineers and PLANT ENGINEERS

ANNOUNCES

Important New Developments in Compressed Air Filters and Pressure Regulators

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Socket screw users who want *what* they want *when* they want it know it pays to specify B-RIGHT-ON! Brighton Socket Screw Products *always* measure up.

Standard or special, Brighton Screws must meet and pass factory standards that are higher even than those specified by the ultimate user of the screws. Rigid control, from initial steel selection to final packaging, certifies every screw as B-RIGHT-ON quality.

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STAINLESS STEEL MAKES THE DIFFERENCE

...its effect on modern equipment

Sanitation . . . easy maintenance . . . inherent cleanliness . . . ready adaptability to a host of different shapes and forms—these are a few of the reasons why more and more designers of food processing, dairy and beverage equipment specify stainless steel.

You'll find it in tubing, tanks, bulk coolers, autoclaves and dozens of other vital pieces of equipment in many different industries.

Stainless steel's superior resistance to corrosion . . . ready availability in scores of work-saving standard shapes adaptable to many needs . . . ease of machining, forming, joining and casting combine to give equipment producers greater freedom of design.

For more information about stainless steel and its growing effect on equipment design and selling problems, see your stainless steel supplier or write ELECTROMET—leading producer of more than 100 alloys for the metal industries, including chromium and manganese used for making stainless steels.

ELECTRO METALLURGICAL COMPANY
A Division of
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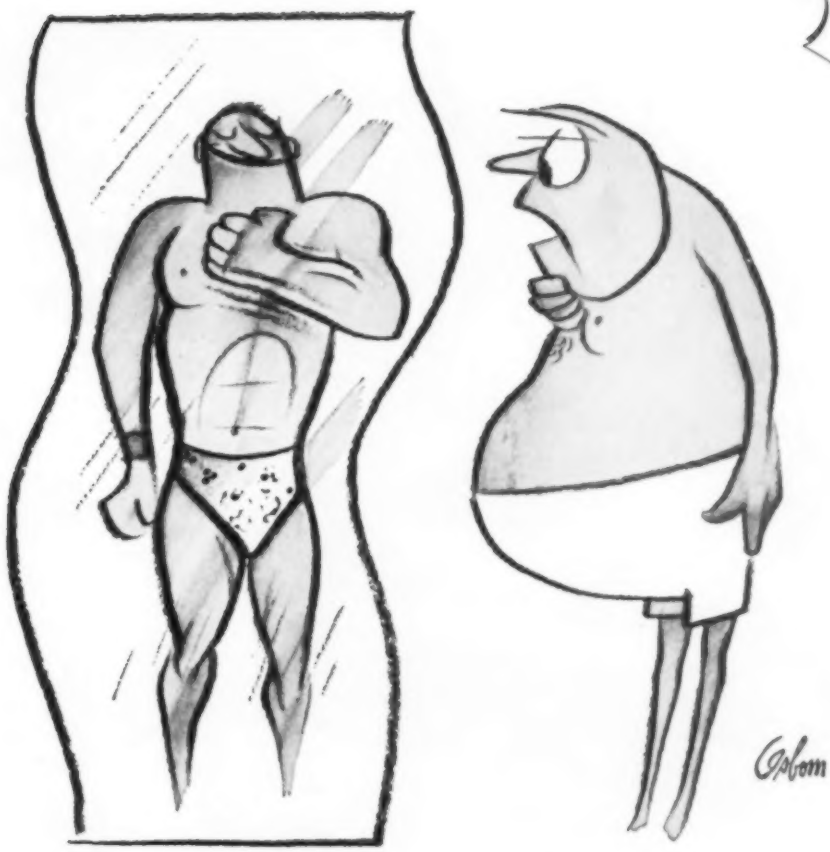
Electromet
TRADE-MARK

Sanitation is a powerful selling tool in the beverage, food processing and dairy fields. That's why the use of sanitary, easy-to-clean stainless steel is growing so fast.



DISTORTION

in circular parts means costly hold-ups on your production lines. End this downtime with metallurgically accurate Cleve-Weld welded parts.

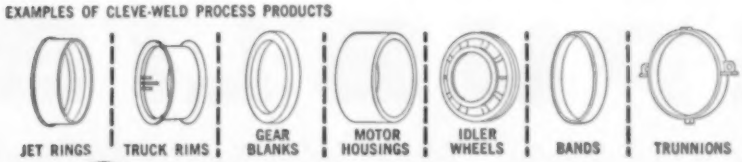
Cleve-Weld Process insures accuracy in circular parts

Cleve-Weld can meet exacting specifications, like those for jet engine rings, because it has the *knowledge, experience* and *facilities.* Modern equipment like oil-quench and hydraulic presses, and under- and over-fired gas furnaces help Cleve-Weld prevent distortion and insure metallurgical accuracy in circular parts.

Put Cleve-Weld's 45 years of *design, metallurgical and production experience* to work to cut your costs. See for yourself how the Cleve-Weld Process can give you accuracy while it *cuts your costs three ways compared to bulky cast or forged parts.* Write or send drawings to Circular Welded Products Sales Department.

THIS IS THE BASIC CLEVE-WELD PROCESS. Rectangular bars or special contoured sections of steel are rolled into a circular form. Next, the part is welded and then expanded into a true circle. This tests the weld and insures accuracy. Later operations add stress relief and desired hardness.

EXAMPLES OF CLEVE-WELD PROCESS PRODUCTS



Another AMF Product

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RIMS · RINGS · WELDMENTS

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AMERICAN MACHINE & FOUNDRY COMPANY
Cleveland 11, Ohio

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Please send me your brochure on the cost-cutting Cleve-Weld Process.

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Title_____

Attach to your company letterhead and mail

Republic COLD FINISHED STEEL...

REPRESENTATIVE PRECISION PARTS made of Republic Cold Finished Steel are shown here. Parts like these have an enviable record of reliability—helping National Cash Registers to total more sales than any other machines, for more than a half century.

REPUBLIC

REPUBLIC STEEL

World's Widest Range of Standard Steels

PERFORMANCE PROVED

in National Cash Registers for over 50 years

The proof of the product is in its performance. That's why we take particular pride in supplying cold finished steel to The National Cash Register Company of Dayton, Ohio.

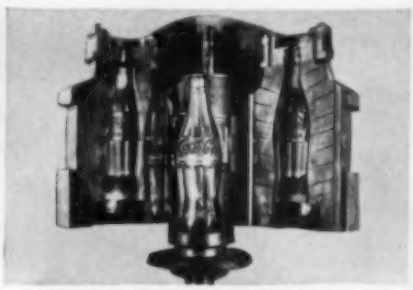
Republic Cold Finished Steel has been helping National Cash Registers ring up sales for more than a half century. Ever since the Union Drawn Steel Company, now our Union Drawn Steel Division, pioneered the cold drawing process, National Cash Register products have totaled enviable service records backed by the uniform excellence of Republic Union Drawn Carbon and Alloy Steel components.

You, too, can capitalize on the many outstanding advantages of Republic Cold Finished Steel. For example, in comparison with hot rolled bars, you get maximum machinability. This feature alone makes possible higher speeds and feeds, finer finished surfaces and longer tool life.

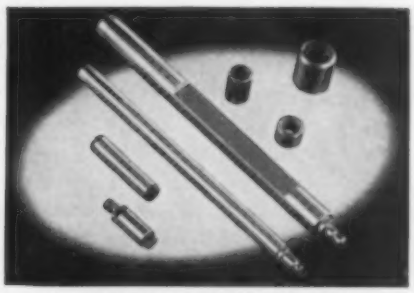
In addition your parts will have higher ultimate strength, yield point and hardness when you use Republic Cold Finished Steel. Extreme accuracy in size and cross section plus an as-received bright, smooth finish enable you to eliminate all further finishing for many applications.

Join the growing list of users scoring production gains through the use of Republic Cold Finished Steel. Contact your Republic representative or your Republic Union Drawn Distributor. Or mail the coupon for full details.

HEAVY-DUTY PERFORMANCE plus minimum weight are provided by these gear train-components made of modern, flight-weight alloy steels. Republic, world's largest producer of alloy steels, can help you determine the precise analysis best suited to your application. Result: A superior product combining strength, toughness, and durability — plus production economy.



SUPERIOR CASTING PERFORMANCE is the basic reason why the manufacturer of this glass-mold insists on Chateaugay, Republic's exclusive premium pig iron. Requirements call for extremely smooth hand-finished surface with surrounding metal free of flaws or porosity. Dense, fine-grained Chateaugay castings meet every need. Rejects are less than 1%. Send coupon for further information.



CORROSION-RESISTANT PERFORMANCE In addition to machinability, strength, and toughness are four good reasons why the manufacturer of these carburetor parts has standardized on Republic Free-machining ENDURO® Stainless Steel Bars. ENDURO is available in a complete range of analyses in cold finished and hot rolled bars, special sections and wire. For complete information, mail coupon today.

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☐ Chateaugay Pig Iron ☐ ENDURO Stainless Steel

Name_____ Title_____

Company_____

Address_____

City_____ Zone____ State_____

FINISH TURN *(right)* is preceded by rough turn from bar stock and semi-finish cut. Material is heat treated 1045 steel forging. Round templates are used, one for each end. As for output—read body text.

PRODUCTION— 4 units to 1

Could be quite a turning problem, this piece—almost 115″ long, with 44″ and 46″ tapered sections! But not, reports the user, when turned on his Air-Gage Tracer-equipped Monarch 16″ Series 61 Engine Lathe.

Not only is he getting 4 times the output possible with a conventional lathe, but maintaining a degree of accuracy and finish not otherwise obtainable. With carbide tooling, he's holding a tolerance of ±.0015″ and securing a surface finish of 32 micro inches.

Reason for the holding of such accuracy on the Monarch is the super-sensitivity of the Air-Gage Tracer. The exclusive combination of air and oil control found on this device requires a stylus pressure of only 5 to 6 ounces against the template. Add to this the further design feature of both air and oil in constant motion and you have instantaneous power cylinder response to the slightest change in template shape.

Now—about your turning requirements! We've got the machines and the tracer controls to better almost any conventional setup. Why not bet a three cent stamp against almost unlimited production improvement? Let us prove it . . . ***The Monarch Machine Tool Company, Sidney, Ohio.***

Monarch

ACCURACY • ECONOMY • LONG LIFE

TURNING MACHINES

FOR A GOOD TURN FASTER . . . TURN TO MONARCH

If you are ever going to need an

OVERHEAD CRANE . . .

you need this book, now!

Before you take the first step in planning your next overhead-crane purchase, you owe it to yourself and your firm to protect that "big-ticket" *lifetime* investment by reading this booklet, "How to Evaluate Crane Bids." Don't wait until the specifications are drawn up. Accurate guidance from the first planning stages will help insure the best return from your crane investment.

Harnischfeger, leader in overhead cranes, offers an unmatched source of background and experience in helping you choose a crane installation — with no obligation, of course. P&H have pioneered every major crane advancement . . . including Magnetorque, for precision control, and now the new Electronic "stepless" crane control for the ultimate in smooth, precise performance.

Send for this free booklet, now. Write Dept. 101E Industrial Division, Harnischfeger Corp., Milwaukee 46, Wisconsin.

GRANITE CITY STEEL COMPANY...

"Keeps Rollin' Along"

And Allis-Chalmers steel mill equipment is helping in a new expansion program designed to increase steel production in mid-America

ALONG the banks of the mighty Mississippi, near the geographical center of mid-America, new steel-making facilities are being planned. Granite City Steel Company is planning another major expansion program which will raise their ingot production 30% by early 1958.

Just two years ago, Granite City Steel completed an $89,000,000 expansion. It was the culmination of a 7-year program, in which Allis-Chalmers supplied all major electrical requirements, bringing this midwestern plant up to maximum efficiency.

In this new modernization, Allis-Chalmers steel mill equipment will again play an important role. So far, Granite City has called on Allis-Chalmers for all the necessary electrical equipment needed to revamp their cold-strip mill, and the single-stand temper mill, plus other auxiliary machines.

Allis-Chalmers specializes in mill modernization and expansion. For specific information on drives, control and other electrical equipment for steel mills, contact your A-C representative, or write Allis-Chalmers, Power Equipment Division, Milwaukee 1, Wisconsin.

Other Allis-Chalmers Products for the Steel Industry

Centrifugal Blowers • Axial Blowers • Arc-Furnace Transformers • Mercury-Arc Rectifiers • Rotary Compressors

Unit Substations • Switchgear • Circuit Breakers • Voltage Regulators • Power Generation Equipment

---

A-C ALLIS-CHALMERS

ALLIS-CHALMERS

A-5178

Regulex is an Allis-Chalmers trademark.

M-g sets supporting cold-strip mill motors. These units are rated at 7750 kw, 514 rpm. Furnished by Allis-Chalmers in 1946, they will be supplemented by new units.

M-G SETS

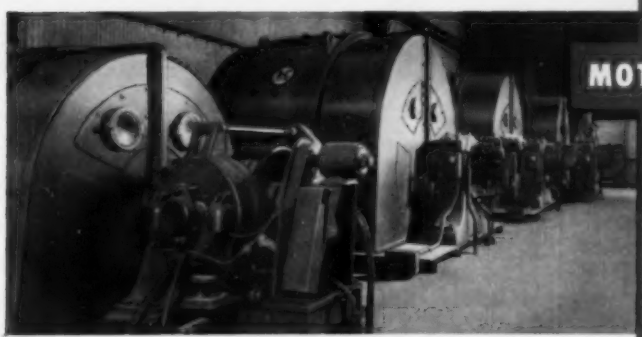
On the 56-inch temper mill, this 4-machine m-g set supporting the skin pass mill motors will be revamped. Two new 225-kw dc drag generator units will be furnished by Allis-Chalmers for this mill.

CONTROL

This variable voltage control board is used on the 56-inch tandem cold reduction mill. New control equipment is being furnished by Allis-Chalmers for new mill expansion at this midwestern steel plant.

Regulex control and totally enclosed control board were furnished by Allis-Chalmers in 1948 for the 48-inch temper mill at Granite City Steel Co. Additional control is being furnished for the 56-inch temper mill.

MOTORS

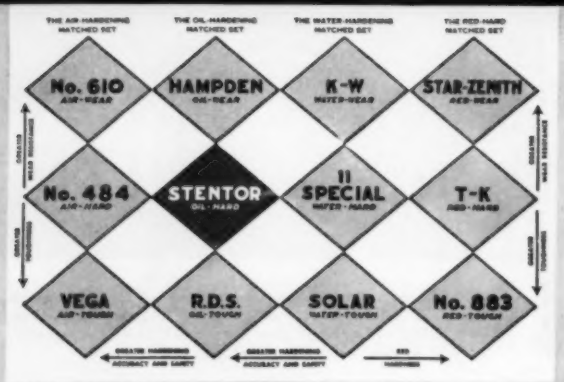


Motor room view at this plant shows Allis-Chalmers units driving delivery reel and main stands. Allis-Chalmers motors furnish drive power throughout the plant. New motors, ranging in size from 25 to 5000 hp, are being installed.

Allis-Chalmers motors shown driving the temper mill include main roll drive, delivery tension, and delivery reel drive. Allis-Chalmers furnished original motors for both temper mills, as well as new motors for increasing capacity.

now

Once again, Carpenter Metallurgists prove their desire and ability to pace the field in developments you want and need!



Like all Carpenter Matched Tool and Die Steels every bar of STENTOR (Oil-Hard) is colored full length in its own distinctive color for quick, positive identification! Immediate availability from your local Carpenter Mill-Branch Warehouse, Office or Distributor.

® *U.S. Patent Office*

..Carpenter extends the built-in safety factor of STENTOR (oil-hard) tool and die steel!

Remarkable heat treating versatility . . .
safe, dependable hardening through a broad range of 1425°F to 1525°F

The many advantages which make STENTOR one of industry's most used and talked-about steels are affected in no way by this exclusive new development. Its simplified analysis remains unchanged. It is still the *easiest* and one of the *safest* oil-hardening steels to harden. Requires no preheating whatsoever. Hardens from a lower temperature. Assures you less size change and distortion . . . uniform hardenability . . . full freedom from decarburization . . . long, dependable service.

And NOW . . . an extended Built-In Safety Factor enables you to heat treat STENTOR tools, dies and parts either of two ways: (1) At temperatures as low as 1425°F for the cost savings this brings you . . . or (2) Place them right in the furnace with other tools that are heat treated at temperatures up to 1525°F, and eliminate special furnace runs.

If you are not already using Carpenter STENTOR, it's time to re-evaluate the extra advantages you get with this versatile die steel.

JUST PRINTED! For more facts on how you and your men can Step Ahead with STENTOR, drop us a line on your Company letterhead for this new descriptive folder.

Carpenter STEEL

Matched Tool and Die Steels

The Carpenter Steel Company, 139 W. Bern St., Reading, Pa.
Export Dept.: The Carpenter Steel Co., Port Washington, N. Y.—"CARSTEELCO"

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For drive design or maintenance, it's the trouble-free, cost-wise way to lasting TRANSMISSION ECONOMY.

You simplify planning; you save time and expense; you get products top-rated for quality and performance. Boston Gear Works, 73 Hayward St., Quincy 71, Mass.

CATALOG No. 56 lists all products; includes 50 pages of simplified engineering data to help you plan lower cost drive design, plant maintenance.

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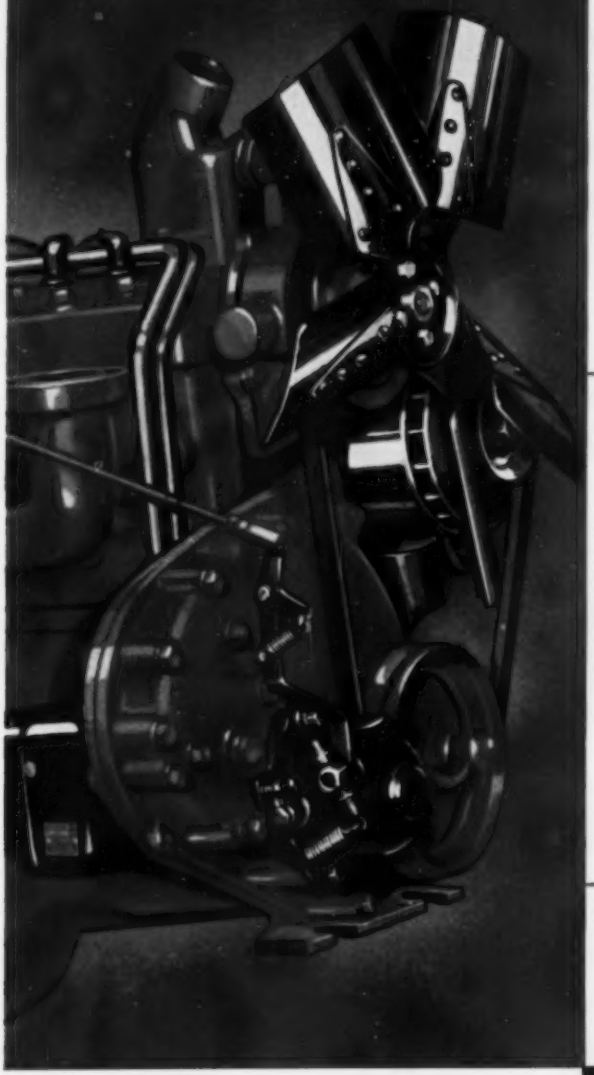
578G

The Payoff Power
is Chrysler



Stoop...

IT'S A MATERIALS HANDLER . . .

Scoop...

A FRONT-END LOADER . . .

Boom...

AN ELEVATING MACHINE . . .

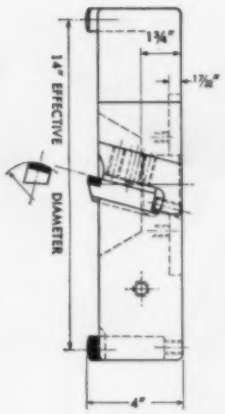
***CHRYSLER INDUSTRIAL* 33,** in-line 6 Engine (265 cu. in. displacement) powers the Model C Scoopmobile—and many other makes of equipment in the construction and materials handling fields. There are five Chrysler in-line 6s, two V-8s—ranging from 230 to 413 cu. inch displacement. For detailed information about Chrysler Industrial Power write: Dept. D2, Industrial Engine Division, Chrysler Corporation, Detroit 31, Michigan.

Here's a real "quick change" artist—the Model C Scoopmobile! Nine different attachments—all of which can be changed and operated by one man—give it exceptional on-the-job versatility. Single tail wheel provides greater maneuverability—especially in close quarters. Chrysler Power gives it extra guts and stamina—at lower operating and maintenance cost.

Chrysler
INDUSTRIAL ENGINES

INDUSTRIAL ENGINE DIVISION • CHRYSLER CORPORATION

Ingersoll Micromill Finishing Cutter
2980MM Series...Page 29, Catalog 66



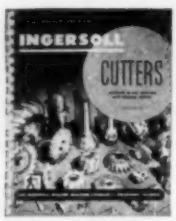
25 Micro Inch Steam-Tight Finish at Westinghouse with this INGERSOLL MILLING CUTTER

Where finish is important, look to Ingersoll for the answer. There is an Ingersoll cutter to meet virtually every finish requirement. For example, the cutter shown above is being used by Westinghouse, Steam Division, in finish milling high pressure turbine cases.

The cutters used for this work were developed by Ingersoll's research department and proved on Ingersoll's testing floor.

An Ingersoll Cutter Division representative will be glad to discuss this and other finish milling experiences with you.

Whether you are concerned with cutter costs, feed rates, longer tool life, or finish, the new Ingersoll cutter catalog will be a valuable guide. Write for your copy today, address Dept. 66V.



Use this new 82 page guide for selecting the right inserted blade milling and boring cutters for your work. Write for catalog #66, today.

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WESTINGHOUSE ELECTRIC CORP.
WHITE MOTOR CAR CO.
WORTHINGTON CORPORATION

CUTTER DIVISION

THE INGERSOLL MILLING MACHINE COMPANY

ROCKFORD ILLINOIS

...lets one man handle work you'd pay a crew to do!

By putting new efficiency, safety and positive control into the hands of Towmotor lift truck operators you enable them to do a *bigger day's work, easier.* You let each one handle jobs you'd normally hire a *gang* to do.

Through modern Towmotor mass-handling each operator has the power to improve your profit picture, because the new Towmotor fork lift trucks multiply their productivity. Look over the new features that operators like best about our latest models—such as:

- New planned-comfort design
- Off-center adjustable seating
- Double action hydraulic tilt
- Newly-improved power steering
- "3-second access" to engine
- Famed 12" reach for all controls

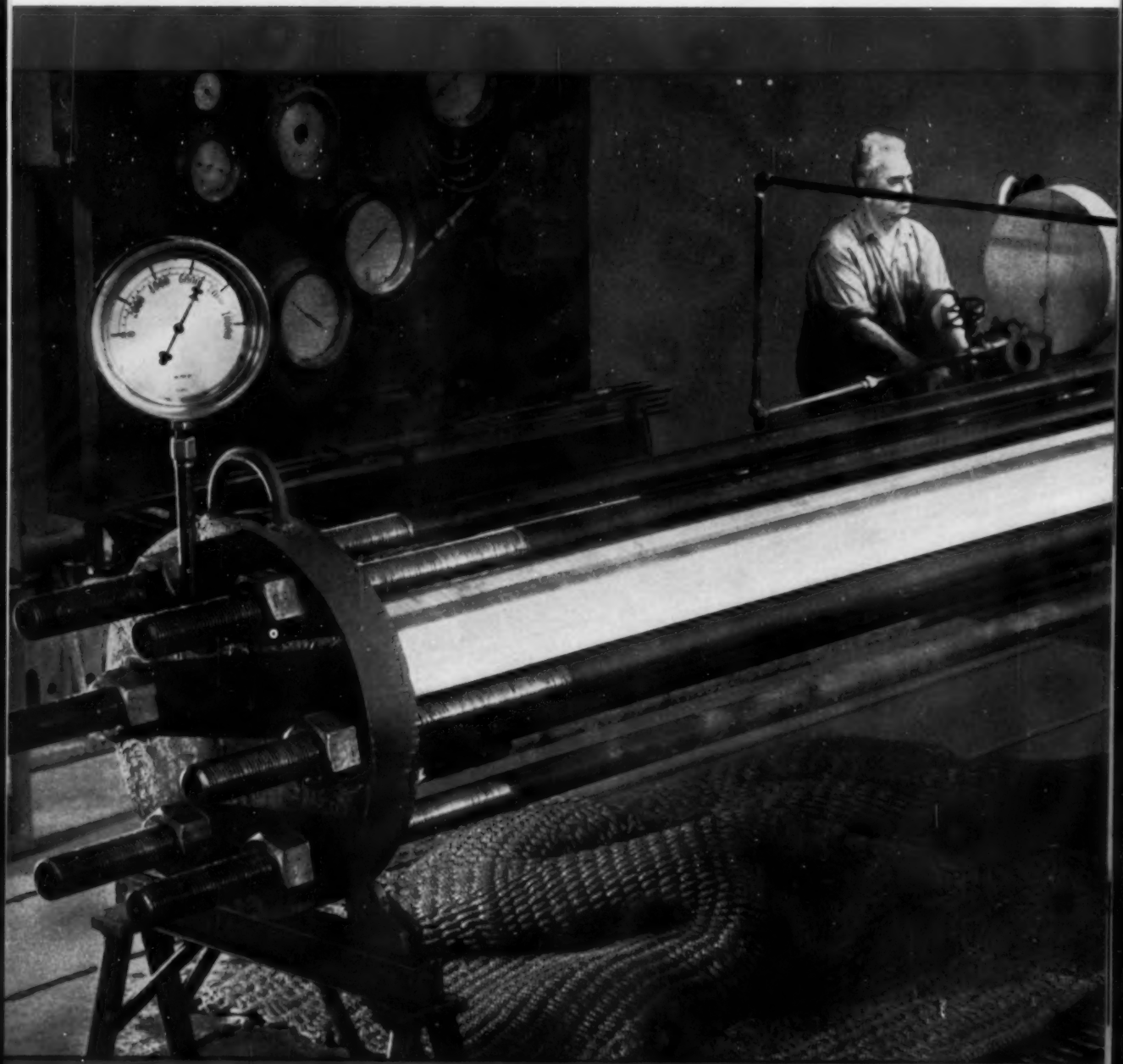
Before you decide on your next fork lift truck, we urge you to get all the facts on the newly-designed Towmotor units. Write to Towmotor Corporation, Cleveland 10, Ohio today and ask for our new illustrated lift truck booklet—No. SP-23.

Leaders for 38 years in building Fork Lift Trucks, Tractors and Carriers

TOWMOTOR
THE ONE-MAN GANG
-GERLINGER

Gerlinger Carrier Company, Dallas, Oregon, is a subsidiary of Towmotor Corporation

STAINLESS STEEL CENTRIFUGALLY CAST MAY BE



ABOVE: Hydrostatic test rig used to qualify each length of pipe.

UNITED STATES PIPE & FOUNDRY CO.

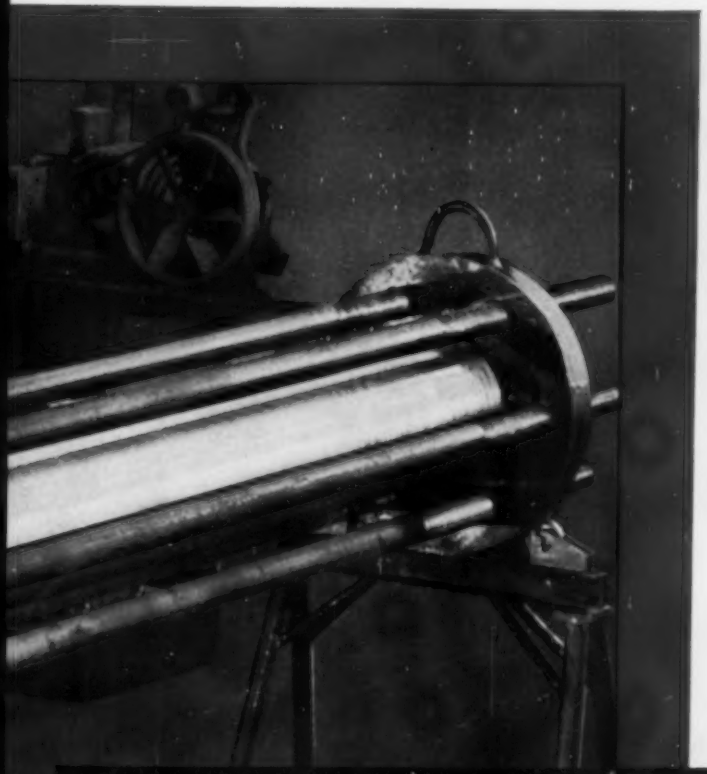
Steel and Tubes Division

STEEL & TUBES U.S. PIPE DIVISION

BURLINGTON, NEW JERSEY

SALES OFFICES: LOS ANGELES, SAN FRANCISCO, CHICAGO, ST. LOUIS, COLUMBUS, DETROIT, PITTSBURGH, HARTFORD, BURLINGTON

THE ANSWER TO YOUR PIPING PROBLEM



Patented U. S. Pipe process meets rigid refinery specifications

The men who design today's petrochemical plants, refineries or Atomic power plants are confronted with piping problems involving temperatures, pressures and corrosive conditions which only a few years ago would have been called impractical, if not impossible.

U. S. Pipe's Steel & Tubes Division recently completed a piping requirement for 700 feet of Type 316 Extra Low Carbon, columbium-bearing stainless for a large petrochemical plant, which is typical of the job metal mold centrifugally cast pipe is doing today under a patented manufacturing process with rigid Quality Control.

U. S. Pipe is headquarters for metal mold centrifugally cast alloy and stainless steel pressure pipe over a wide range of special and standard analyses —in large or small quantities.

Write and outline your refining problems. We may be able to help.

Note these exacting specifications on 316 Cb ELC Stainless Steel Pipe demanded by one of nation's leading oil companies:

MATERIAL REQUIREMENTS: Pipe shall conform to ASTM Specification A-362-52T.

CHEMICAL ANALYSIS: Modified AISI Type 316 Cb (ELC), with *one percent* spread on chrome and nickel.

FINISH: Each pipe to be turned, bored and faced to surface finish of 125 micro inch or better. O.D. tolerance plus 1/16″ minus 0″; I.D. tolerance plus 0″ minus 1/32″. Pipe size: 12″ O.D. × 1.17″ wall.

MECHANICAL TESTS: Tensile Tests — 2 tests required on each pipe after heat treatment; one at room temperature, one at 700° F.

INSPECTION REQUIREMENTS

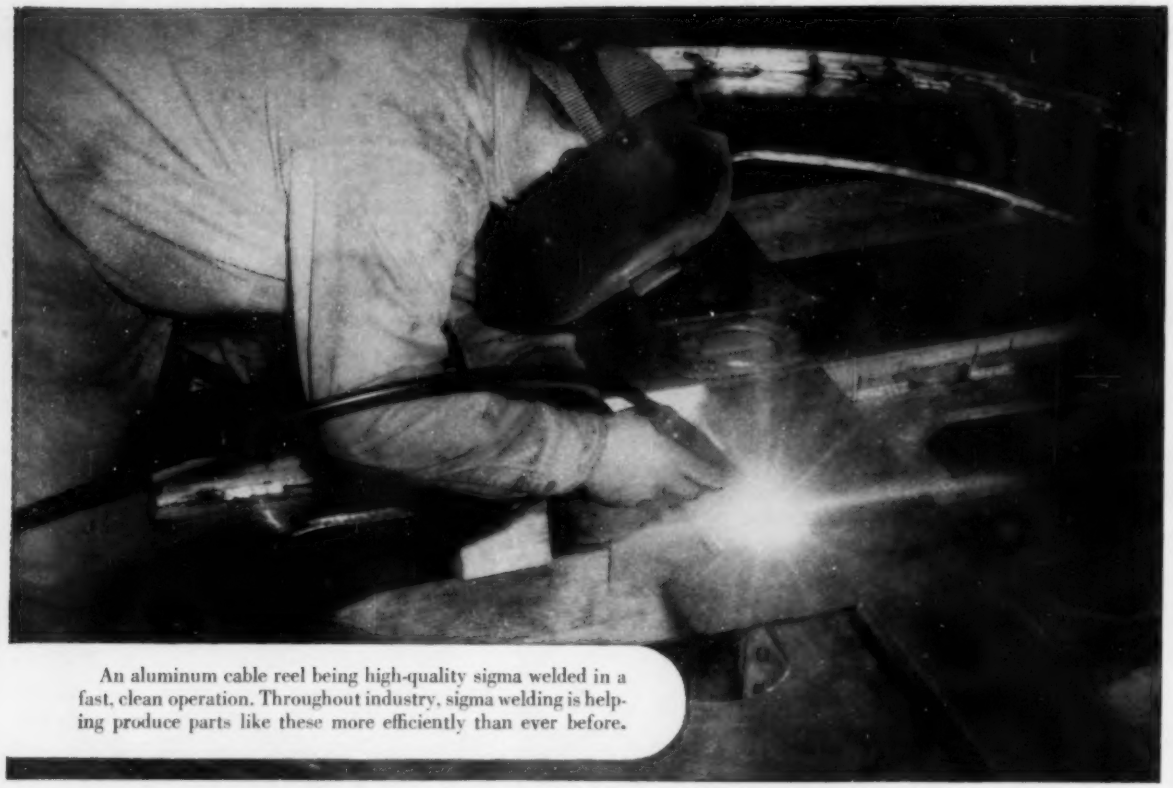
1. Etching test on sections cut from each end of pipe.
2. Radiographic Inspection — Required complete circumferential coverage of at least an 8″ wide section at each end of each pipe in accordance with ASTM Specification E71-52.
3. Fluid Penetrant—Entire O.D. and I.D. surface each piece.

HEAT TREATMENT: Heat for 4 hours at 2100° F.—2150° F., water quench, follow by 5 hours at 1500° F.—1600° F. Cool in still air.

HYDROSTATIC TEST: Each length tested to stress of either 90% of the minimum cold yield strength or a maximum pressure of 6800 psi —whichever is lower.

SIZE RANGE AND COMPOSITION FLEXIBILITY

Outside Diameter—6″ to 50″
Wall Thickness—⅜″ and up
Length—Up to 16′
Types of Stainless—All Standard AISI and ACI grades of ferritic and austenitic stainless, including No. 20 Alloy, 17-4 P H, 17-7 P H and E.L.C. grades.



An aluminum cable reel being high-quality sigma welded in a fast, clean operation. Throughout industry, sigma welding is helping produce parts like these more efficiently than ever before.

SAVED-50% of fabricating cost...

by using

SIGMA WELDING

Sigma welding's combination of automatic wire feed, and dependable argon gas-shielding accounts for the fifty per cent cost saving made in fabricating aluminum cable reels like the one shown above. Top quality welds are made in these ¼ and ½ inch thick aluminum parts at speeds up to 20 inches per minute—and no post weld treatment is necessary.

The Ease of Handling gained by automatic wire feed both simplifies and speeds welding operations. A shield of inert argon gas envelopes and protects the weld puddle from harmful effects of the atmosphere, and eliminates need for flux.

Sigma Welding Is Ideal for a Wide Range of Jobs because it joins all commercially fabricated metals, and can attain full penetration up to ¼ inch in a single pass. A complete line of portable manual, and automatic mechanized apparatus is available—and all are easy to operate and maintain.

For more information on sigma welding, or on any of LINDE's modern methods of joining metals, call your local LINDE representative—or write for free illustrated literature. Start saving now, do it today.

Linde Air Products Company

A Division of Union Carbide and Carbon Corporation

30 East 42nd Street UCC New York 17, N. Y.

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The term "Linde" is a registered trade-mark of Union Carbide and Carbon Corporation.

Linde Trade-Mark

in the home everybody benefits from

STAINLESS STEEL

THE ARCHITECT designs Stainless Steel into windows, kitchens, work surfaces, ovens and other important places because he knows there is nothing like Stainless for clean, lasting beauty.

THE BUILDER has had long experience with Stainless Steel. It's easy to install, does not chip or peel, and its beautiful finish presents no problem on matching or replacement.

the owner likes living with Stainless Steel. It's always gleaming and beautiful, cleans with a wipe, and lasts forever. And, to complement her kitchen she loves to own those shiny pots, pans, tableware, and appliances, all made of Stainless Steel.

McLOUTH STAINLESS STEEL

FOR THE PRODUCT YOU MAKE TODAY AND THE PRODUCT YOU PLAN FOR TOMORROW SPECIFY McLOUTH HIGH QUALITY SHEET AND STRIP STAINLESS STEEL

McLOUTH STEEL CORPORATION DETROIT, MICHIGAN • MANUFACTURERS OF STAINLESS AND CARBON STEELS

Undetected Machining Costs Can Lie Right on the Surface

Walking through your plant, it would be hard to see the needless costs hidden in undermachining or overmachining. These unnecessary costs can only be computed after parts are rejected by the inspection department and returned for further work . . . *or accepted with a costlier finish than required!*

Economy in surface finishing depends on machining to exact specifications. Whenever a surface is machined more or less than required, money is wasted. To avoid this requires accurate surface finish measurement *at the machine.*

Up to now, finish has been judged at the machine by looking or feeling.

The new Brush SURFINDICATOR provides a fast, accurate method for determining right at the machine the degree of surface finish produced.

This need not exist any longer, for a portable tool has been devised that makes accurate surface finish checking a simple matter, *anywhere in the plant.*

New Tool Eliminates Finishing Losses

The Brush SURFINDICATOR* is an easy-to-carry surface finish measuring device that can be used by any worker wherever needed—for in-process checking of surface smoothness. With this new tool, it is possible to meet optimum specifications without wasting material, time or money.

The operation is simple. A hand-held stylus is stroked over the surface that is to be measured. A direct reading is obtained in microinches, and the worker or inspector immediately knows the exact surface finish already produced. Not limited to one material, the SURFINDICATOR can be used on metals, glass, plastic, paper, wood and other surfaces for maximum finishing economy.

Both the new ASA Standards and the complete Brush SURFINDICATOR description are contained in this booklet. Send for your copy now.

Find out all about this new portable tool that produces savings by preventing finishing waste in your plant. The full story is told in the informative Surfindicator booklet. Also included are the new ASA Standards on surface finish for industrial use. Write for your copy today. *TM

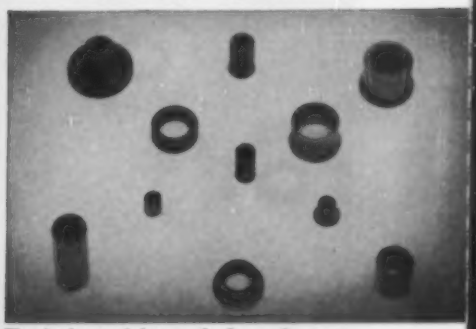
BRUSH ELECTRONICS COMPANY

3501 Perkins Avenue, Cleveland 14, Ohio

BRUSH ELECTRONICS

DIVISION OF CLEVITE CORPORATION

Fabricated parts and gears formed on Baldwin Compacting Presses.



Typical straight and flanged powdered metal bushings made on Baldwin Compacting Presses.

Other parts being made at United States Graphite on Baldwin presses. The double hub and counterbored parts are test pieces. Others are production items.

New, low-cost compacting presses for powdered metals and ceramics

Baldwin-Lima-Hamilton Corporation announces that its 100 years' experience and know-how in building hydraulic presses has been incorporated in a new, low-cost compacting press—the 30W—specifically designed to serve the powdered metal and ceramics industry.

Its 1-piece frame and floating die deliver the same uniform pressure, the same rigid 4-point guiding, as our regular heavy duty 4-column hydraulic presses. The 30W is designed for versatility—extra motions may be added as requirements become more complex without the need for additional machining.

Rated pressure of the Baldwin Model 30W is 30 tons, with a 20-ton ejection capacity. Stroke is adjustable through its entire fill range of 0 to 4½ in. For complete details, including specifications, write to the Hamilton Division, B-L-H Corporation, Hamilton, Ohio.

Hamilton Division Hamilton, Ohio

BALDWIN · LIMA · HAMILTON

Diesel engines • Mechanical presses • Can making machinery • Machine tools

BALDWIN BLH LIMA-HAMILTON

The manufacturers of jet aircraft engines, (and American Welding supplies every major jet engine manufacturer), have learned that there is an inherent savings of material and machining time in the use of flash-welded rings and components fabricated from mill-rolled and extruded shapes.

Might there be a lesson here for the manufacturers of missiles? We think that a missile could go a long way using Amweld's facilities and know-how.

Why not contact our Industrial Products Division today for more information about how Amweld may serve you.

THE AMERICAN WELDING & MANUFACTURING CO.
110 Dietz Road • Warren, Ohio

AMERICAN WELDING
The World's Leading Manufacturer of Welded Rings

Metalworking Outlook

Paradox in Steel

Although small tonnages of steel plates and structural shapes are being sold at premium prices (see page 57), equally small amounts of flat-rolled and tool steels are going below standard prices. A few warehouses, particularly in Detroit, have been liquidating cold-rolled sheet far below published quotations. Some surplus stock buyers of tool steels have been undercutting regular suppliers. They have been stocking up on off analysis materials from the mills, then offering them on surplus lists as standard grade tool steel. M-2 tool steel normally sells for $1.18 base or $1.35 per pound net. The surplus stockers offer it at 70 to 90 cents per pound.

New England Steel Mill in Trouble

Northeastern Steel Corp., Bridgeport, Conn., will reorganize through receivership under the National Bankruptcy Act. Production will continue under trustees if the reorganization petition is approved. Northeastern was organized in December, 1954, with the purchase of the steelmaking assets of the Stanley Works. The move followed several years' agitation for establishment of an integrated steel mill in New England. Northeastern has open hearth and electric capacity, but no blast furnace facilities. It had planned to attain an ingot capacity of 300,000 tons, an objective that has not been reached. Operating profits have lagged behind interest requirements, and working capital has declined.

Mr. Flemming Seeks Nickel Solution

Look for Arthur Flemming, director of the Office of Defense Mobilization, to continue in Washington long enough (perhaps 30 to 45 days) to try to settle the nickel problem. One move may be to make more of the Nicaro, Cuba, production available to a wider cross section of metalworking.

Expansion in Titanium Sponge

Watch for titanium sponge production to top 25,000 tons this year, compared with 14,500 tons in 1956. When present production plans are completed, the six leading suppliers will have an annual capacity of 36,500 tons. Producers of titanium mill products have no complaints as to quality or quantity (page 54).

Developments in Zirconium

An Australian process for separating hafnium from zirconium may reduce the price of separation from some $3 a pound to about 25 to 50 cents. National Distillers Products Corp.'s U.S. Industrial Chemicals Co. has an option on a licensing agreement. If the process proves out, it may mean that it would be more profitable to sell only hafnium-free zirconium. The

Atomic Energy Commission wants all the hafnium it can get. One million pounds of zirconium contains 20,000 lb of hafnium.

Southeast Freight Rates Up

The Interstate Commerce Commission granted Southeastern railroads a 5 per cent general increase in freight rates to take effect 15 days after the roads file necessary papers with the agency. They asked a 7 per cent boost. Most of them also indicate they want further increases. Add them to the hike just authorized, and the total increase will come to 15 per cent.

One-third More Recruits Needed

American industry is looking for one-third more college graduates in 1957 than in 1956. A study by Dr. Frank S. Endicott of Northwestern University shows that 192 companies seek 22,711 men this year, compared with 17,185 last year. Average starting salary will be $401 a month, but about $5000 a year because most companies grant a raise to the novitiates after six months. Nearly half the recruits are sought in engineering fields. The rest are needed for sales, general business trainees, accounting and many other areas.

Oil Storage Threatens U.K. Steel

Unless more fuel oil comes into Britain soon, steel output will be cut back again. That would come at a time when some steel-consuming industries (which have been down) are starting to get back on their feet—autos, particularly. Strongest demand for steel is coming from heavy industries like shipbuilding, freight cars and electrical power. To conserve steel supplies, exports are regulated by the government. Mill output is booked through June.

Memo on the Edsel

Ford Motor Co.'s Edsel will be offered in four series with a total of 18 models. The name of the lowest priced series will be the Ranger, followed in the order of increasing price by the Pacer, Corsair and Citation. All cars will be in the medium-price range. Edsel may start signing 1200 to 1500 dealers within four to six weeks. Plans are to introduce the car next fall.

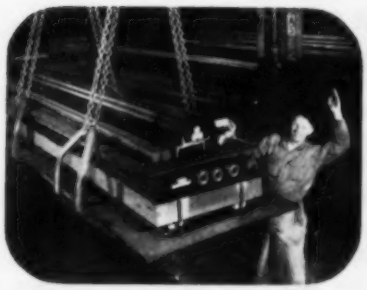
Straws in the Wind

Strike at Woodward Iron Co., Woodward, Ala., is in its fourth month . . . Strike at Union Carbide & Carbon Corp.'s Linde Air Products Co. is slowing steel production by pinching off oxygen supplies . . . The Navy has awarded Ingalls Shipbuilding Corp. and General Dynamics Corp.'s Electric Boat Division contracts to build three nuclear-powered submarines . . . AEC and the Maritime Administration have awarded contracts for six design studies to develop commercially competitive nuclear powered merchant ships.

Six ways
Ryerson can serve you

Chances are that when you think of steel from stock, Ryerson springs first to mind. And for good reason. Every kind of steel, every shape and size, is immediately available from our tremendous reservoir.

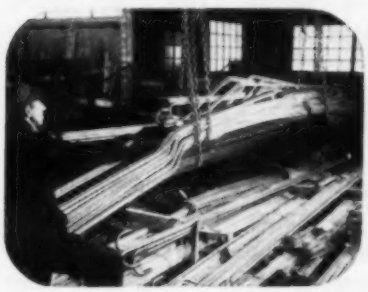
But perhaps you don't always remember that Ryerson offers you much more—many other important products and services such as aluminum, plastics and fabricated construction steel. The pictures below illustrate the extent of our service. For a complete listing see the familiar red Ryerson catalog. Then as your needs arise—or whenever you have a question of selection, fabrication or application—look to Ryerson as your most complete and dependable source of help.



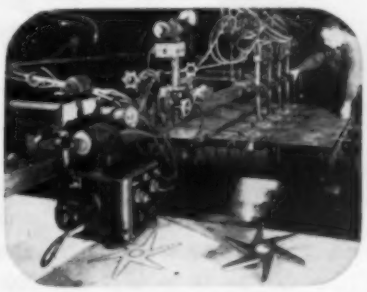
STEEL FROM STOCK
Carbon steels, alloys, stainless—bars, structurals, plates, sheet and strip, tubing—you can get quick shipment of one piece or truckloads from the world's largest steel stocks, at Ryerson. Get the steel with the certified seal—of quality.

ALUMINUM FROM STOCK
In areas served by our Chicago, Milwaukee, New York, Boston and Connecticut plants, draw on Ryerson stocks for aluminum too—sheets, coils, bars, plates—practically any aluminum requirement in stock sizes or cut to your order.

PLASTICS FROM STOCK
The convenience and dependability of Ryerson service is also available to buyers of industrial plastics—PVC pipe, valves and fittings, sheets and rods, rigid Kralastic pipe, flexible polyethylene pipe and tubing, etc.



FABRICATED CONSTRUCTION STEEL
Re-bars, spirals, etc. for reinforced concrete construction are fabricated at Ryerson plants from coast to coast. Also, at Chicago, Ryerson fabricates structural steel for the framework of buildings, bridges, etc.



FLAME CUT STEEL SHAPES
Your nearby Ryerson plant can quickly flame cut almost any shape from carbon, alloy or stainless steel—producing a single piece or thousands accurate to size and ready for your application. We take the work load—you save money.

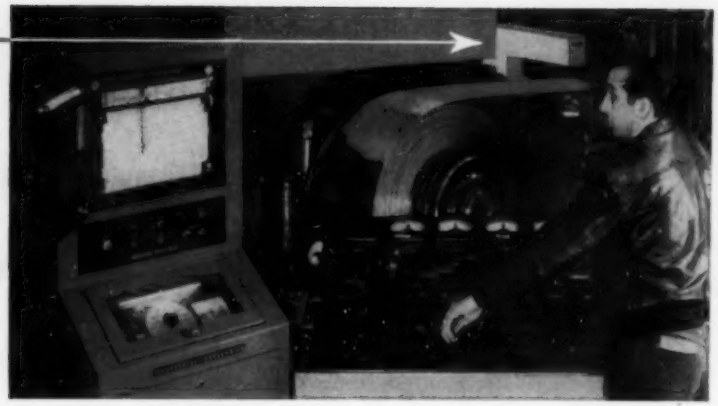
MACHINERY AND TOOLS
The broadest line of metal-working equipment available from a single source is offered by the Ryerson Machinery and Tool Division. You can choose from thousands of types and sizes produced by nearly one hundred manufacturers.

RYERSON STEEL

In stock: Carbon, alloy and stainless steel—bars, structurals, plates, sheets, tubing, industrial plastics, machinery & tools, etc.

JOSEPH T. RYERSON & SON, INC. PLANTS AT: NEW YORK • BOSTON • WALLINGFORD, CONN. • PHILADELPHIA • CHARLOTTE • CINCINNATI CLEVELAND • DETROIT • PITTSBURGH • BUFFALO • CHICAGO • MILWAUKEE • ST. LOUIS • LOS ANGELES • SAN FRANCISCO • SPOKANE • SEATTLE

ATOMS-FOR-PEACE HELP ROLL AND CONTROL DSC STRIP



DSC adopts stripmaking improvements so users can get the most out of the product

DSC KEEPS PACE WITH STRIPMAKING ADVANCES

COLD ROLLED STEEL STRIP is and always has been one of our bread-and-butter lines. That's why we try to keep abreast of all advances in stripmaking methods and practices.

Our two main purposes are (1) to keep our operations efficient and competitive; (2) to help strip users get the most out of the product.

ELECTRON GAUGE

THICKNESS RECORDER

Call your nearest DSC Customer "Rep" for further information about electronic stripmaking— or about any DSC product or service.

DSC "FIRSTS" IN STRIPMAKING

Here is a timetable of innovations we introduced into the industry:

1935 —First to use the 4-Hi reversing principle in strip production.

1939 —First to use the radiant tube, gas fired, portable bell type annealing furnace. (This development obsoleted box annealing practice.)

1941 —First to use the semi-continuous coil pickling method. (This improvement obsoleted tub pickling of coils.)

1946 —First to use the modern convector principle in single stack annealing furnaces.

1956-1957 —Among the first to adopt Industrial Nucleonics Corporation's AccuRay® electronic system of rolling and controlling strip thickness on 4-Hi reversing mills. (This "miracle of the atomic age" is destined to revolutionize the manufacture of sheet and strip steel.)

Customer Satisfaction Is Our Business

DSC MILL PRODUCTS, PORTSMOUTH DIVISION, PORTSMOUTH, O

Hot Rolled and Cold Rolled Sheets • Low and Medium Carbon Manufacturers' Wire • High Carbon Specialty Wire • Aluminum Cable Strand Reinforcement • Rope Wire • Tire Bead Wire • Welded Wire Fabric

DETROIT MILL DIVISION, DETROIT, MICH.
EASTERN MILL DIVISION, HAMDEN, CONN.

Cold Rolled Carbon Steel Strip
Flat Cold Rolled Carbon Spring Steel

DETROIT DSC STEEL

DETROIT STEEL CORPORATION

GENERAL SALES OFFICE, DETROIT 9, MICHIGAN

CUSTOMER "REP" OFFICES:

Charlotte, N. C., Chicago, Cincinnati, Cleveland, Columbus, Ohio., Dayton, Ohio., Detroit, Grand Rapids, Mich., Hamden (New Haven), Conn., Indianapolis, Jackson, Mich., Louisville, Ky., New York, St. Louis, Toledo, Worcester, Mass.

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How Much Steel?

How much steel will be produced in 1957?

The question is of vital interest because steel is a basic factor in the economy.

Before attempting to spell out an answer, let's look at what is happening in steel.

Only eight years ago some of the experts thought steel consumption would average no more than 1025 lb per person in 1955 (measured in terms of ingots). Actually, it turned out to be about 1540 lb.

On Jan. 1, 1957, the industry had a capacity of 133.5 million ingot tons—equivalent to 1582 lb for each of the 168.7 million persons in the U.S. on that date.

This year the industry is spending $1.7 billion to expand capacity 6 million tons. That's 42 per cent more than the 1956 outlay of $1.2 billion. Some—but not many—of the expenditures planned for this year have been postponed because the government did not grant fast tax write-offs.

In 1958, the industry is scheduled to add another 5 million tons of capacity. From 1959 to 1970, it will add 40.5 million tons. A capacity of 185 million tons in 1970 will provide each person at that time with 1885 lb of steel.

The industry is banking on the continuing growth in its markets in the years ahead, but it is immediately concerned with the question of how much steel it can sell in 1957. The answer can be salted with a lot of "ifs."

If metalworking activity lives up to the expectations of a broad cross section of its executives reporting in the Jan. 7 issue of STEEL, production could hit 120 million tons. It will if operations average 90 per cent of capacity. So far this year, they have been in the high 90s.

If the industry operates at 95 per cent in the first half and 80 per cent in the second half, production will be 118 million tons. If the rate holds at 95 per cent through the year, production will be 126 million tons.

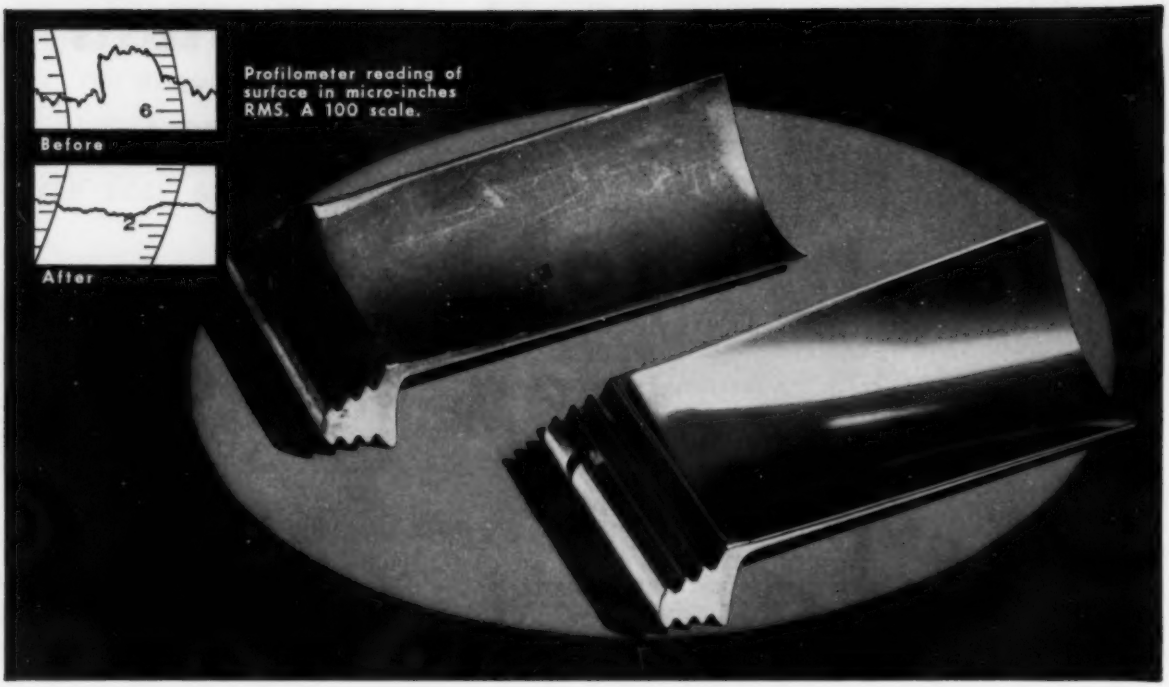
Gloomier forecasters are talking about 112 to 115 million tons—about even with or slightly below the 1956 figure.

We are inclined to go along with the more optimistic views of the executives reporting to STEEL. We think hard spots in the economy will offset soft spots. Steel production will be in the area of 118 to 120 million tons.

Steel has an excellent chance of breaking the record (117 million tons) it set in 1955.

Irwin H. Such

EDITOR-IN-CHIEF



Cut parts finishing costs, maintain exact tolerances, get absolute uniformity with *Roto-Finish* processes

Roto-Finish, pioneers in precision barrel finishing, offer you a complete finishing service. Savings on deburring, descaling, grinding, polishing, coloring and surface improvement are tremendous. Expensive hand finishing methods can be eliminated.

Roto-Finish processes are controlled to produce the finish you need with no significant dimensional changes. You get absolute uniformity of finish in quantity lots.

Many prominent manufacturers now using Roto-Finish processes are saving money on finishing costs. (Names on request).

ROTO-FINISH CHIPS, COMPOUNDS AND MACHINES ARE OF THE HIGHEST QUALITY

Roto-Finish has never sacrificed quality for the sake of price. Through the years, Roto-Finish has carried on a continuous program of process and product improvement to meet the needs of modern industry. When you choose Roto-Finish processes, you can be sure that you are getting the best in supplies, equipment and complete continuing engineering service.

ROTO-FINISH GUARANTEES RESULTS

There is no costly trial and error involved in the purchase of Roto-Finish equipment. You submit unfinished parts to Roto-Finish along with a finished sample and a description of the finish you require. These sample parts are processed in the Roto-Finish Sample Processing Laboratories, where experienced engineers determine the combination of chips, compounds, and machine required to do the job. Roto-Finish guarantees to reproduce the same results in your plant, using the Roto-Finish processes, that are achieved in sample processing. This service demonstrates for you exactly what you can gain by using Roto-Finish processes.

The sample processing service is available to help you with your finishing problem. Take advantage of this opportunity to save on finishing costs. Send samples of finished and unfinished parts and details of the type of finishing equipment available in your plant.

SEND FOR THIS FREE TECHNICAL DATA FOLDER

It describes the basic process, chips and compounds and the complete Roto-Finish line of standard and special machines.

Roto-Finish COMPANY

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SPAIN — Instituto Electroquimico, S. A. — Corcega 58 — Barcelona

National Tool & Die Manufacturing Association

Tool and Die Shops Look at 1957

Business: Good as last year's
Prices: Will probably be forced up
Skilled labor: Continues scarce
Hours: 50 to 55 hours a week common

Tool and Die Sales High

Metalworking's bellwether industry finds military and atomic orders on way up; civilian lines are mixed. Prices not expected to increase as much as they did in 1956

ANOTHER record breaking year is in sight for the more than 3000 firms in the nation's contract tool and die industry. Shipments last year exceeded the previous high set in 1953.

There are no official figures on last year's shipments, but industry leaders conservatively estimate them at $800 million.

Many shops think they will do a little better this year. A few feel that tight money may affect them later in the year.

Typical is the statement of C. J. Dempwolf, vice president, Kidde Precision Tool Corp., Roseland, N. J.: "We expect that business in 1957 will be as good as it was in 1956." He looks for substantially more defense orders, fewer industrial orders.

Breakdown — James R. Barth, Barth Corp., Cleveland, says the government is increasing its spending for atomic and military uses, but orders from appliance makers are falling off. Aircraft and electronics orders will be up this year, predicts Philip Hurley Sr., Micro Tool Co., Hartford, Conn.

More work for missiles is seen by Mechanical Specialties Co., Los Angeles. Walter Krieger, Star Mfg. Co., Chicago, finds business good in electronics, large appliances and kitchen utensils but down in radio and television. Other tool and die shops report a noticeable slowdown in orders for color television.

Many shops in Detroit are down sharply because fewer changes are scheduled for the 1958 cars. Part of this drop-off is being made up by orders from the appliance and aircraft industries. A pickup in automotive orders is hoped for this spring. Detroit shops that do not specialize in automotive work have only a slight slackening of orders.

Busy, Busy—George S. Eaton, executive secretary, National Tool & Die Manufacturers Association, Cleveland, says the shortage of skilled help continues serious, and most shops are forced to work 50 to 55 hours a week.

A survey by the Tool & Die Institute of about 365 member shops in the Chicago area indicates they need at least 400 to 500 journeymen.

Arrow Tool Co. Inc., Wethersfield, Conn., states tool and die shops in central Connecticut "can use 250 to 350 tool and die makers, machinists and instrument makers right now." And the estimate is termed "conservative."

Brighter Side — "Tool and die makers are not on the move as they were several years ago. They stay put due to fringe benefits and seniority," comments A. McMillan,

general manager, Helfrecht Machine Co., Saginaw, Mich. He adds: "The answer is to train more apprentices."

Mr. McMillan says you can find enough men to enter apprentice training if: 1. You sincerely want apprentices. 2. Have a properly organized program. 3. See that your program is carried out.

A STEEL survey shows the industry evenly split between those companies which can find enough young men for apprenticeships and those who cannot. Shops in the Cincinnati area say the search for candidates is a problem of quality, not quantity.

Prices — Boosts of 10 per cent last year were typical. Some were less. Some went up to 15 per cent. Prices will not go up as much this year. Predictions range from no increase to a boost of 10 per cent —the most common is 5 per cent.

Exports, Imports — U.S. shops export a small number of tools and dies, mostly to South America and South Africa.

German and English shops seem to be in a position to undersell in this country because their labor costs are only 50 to 70 cents an hour. Some dies are exported into Detroit and other areas. Yet few companies feel that there is any competition. Joseph N. Huser, president, B & H Tool & Machine Corp., Indianapolis, reports that he saw many plants building tools for American industry when he visited Europe last year.

J. J. Kratovil, Simplex Machine Tool Co., Pittsburgh, says a firm buying from Europe creates poor relations with its usual sources of supply. Victor Voight, vice president, Bunell Machine & Tool Co., Cleveland, comments that some companies ordering from Europe have had to send key men abroad to supply information needed to get the work done.

What's New?—Although the use of plastics for aircraft and autos is well under way, contract tool and die shops are just getting started.

The biggest use, says Norwood Engineering Co., Dayton, O., is in form dies. Paul E. Rauch, Tool Specialties Co., Robertson, Mo., finds that plastics work well on special tools. He estimates its use is increasing 10 per cent a year.

Titanium Metals Corp. of America.

Titanium Mill Product Shipments

	(Tons)
1958	15,000
1957	11,500
1956	5,100
1955	1,900
1954	1,200
1953	1,100

Shipments for 1957 and 1958 are estimated by Titanium Metals Corp. of America. STEEL made estimate for 1956. U.S. Department of Commerce compiled 1955 shipments. Figures for 1954 and 1953 are from Rem-Cru Titanium Inc.

Titanium Shipments Grow

SHIPMENTS of mill products more than doubled in 1956 and will double again this year, but titanium producers are not satisfied. Although defense demand continues to soar, there's something missing—a firm, well-developed civilian market.

While the civilian user's quota of mill product shipments remains at 10 per cent, his allotment has grown from 190 tons in 1955 to 510 tons in 1956 and probably will hit 1150 tons this year. But civilian manufacturers are not taking their full quota. One supplier comments: "About 3 per cent went to civilian users in 1956."

Going Up—Rising demand from aircraft industries accounts for the series of production records (see chart). T. W. Lippert, manager of sales and technical service, Titanium Metals Corp. of America, New York, says: "Practically all advanced aircraft, jet engines and guided missiles use large quantities of titanium, particularly in areas subjected to high heat."

Civilian applications include fire walls, nacelles and jet engine parts for civilian planes and tiny all-titanium ceramic electronic tubes. Jets probably represent the largest single use. They take sheets, bars and structurals. The chemical industry is another leading user. In-

dustries pegged as big potential users: Marine, ore beneficiation, paper, atomic energy, food processing, surgical and orthopedic products, petroleum, photographic, textiles, containers and electrical.

Sales officials at Mallory-Sharon Titanium Corp., Niles, O., say: "The metal finds civilian applications because of its high strength-to-weight ratio, its ability to retain mechanical properties at high temperatures and its corrosion resistance."

Lower Prices—Sponge declined from $3.45 to $2.75 per pound in 1956. Producers are searching for a new extractive procedure to lower costs still more.

Mill product prices have dropped, too. The base price of sheets was $13.10 a pound early last year. Now it is $11.60. Says Titanium Metals: "The last decrease in mill product prices was due to production efficiencies."

Oscar A. Bamberger, district manager of Republic Steel Corp.'s Central Alloy District, says: "Practically all sponge being produced today is of first-class quality. Purity is up; hardness is down."

Expansion—Ingot melting facilities are growing. Last year, Oregon Metallurgical Corp., Albany, Oreg., started an ingot melting facility, and Harvey Machine Co. Inc., Torrance, Calif., put ingot furnaces into operation to melt extrusion rounds.

Mallory-Sharon will complete the installation of five furnaces in a new melting plant by Apr. 1 and double its output of mill products this year. Rem-Cru Titanium Inc., Midland, Pa., added new furnaces and rebuilt existing ones in 1956.

Producers have new rolling mill equipment on order. Crucible Steel Corp.'s Sendzimir mill at Midland, Pa., scheduled for completion late this year, will roll stainless and titanium strip. Another Sendzimir mill will be in production this spring at Allegheny Ludlum Steel Corp.'s plant in Brackenridge, Pa.

Titanium Metals (the company is partly owned by Allegheny Ludlum) will roll titanium on that mill and expects to obtain greater quality and gage control of wide sheets, with improved over-all flatness.

How Battelle Pictures Steel Output and Scrap Use

(Thousands of net tons)

Year	Steel Ingot Production[1]	Total Scrap	HOME SCRAP[2] Quantity	HOME SCRAP[2] Per Cent of Total	PURCHASED SCRAP[2] Quantity	PURCHASED SCRAP[2] Per Cent of Total
1964	158,400	111,036	61,155	55.1	49,881	44.9
1963	153,800	107,812	59,379	55.1	48,433	44.9
1962	149,200	104,589	57,604	55.1	46,985	44.9
1961	144,600	101,365	55,829	55.1	45,536	44.9
1960	140,000	98,142	54,053	55.1	44,089	44.9
1959	135,400	94,918	52,278	55.1	42,640	44.9
1958	130,800	91,694	50,502	55.1	41,192	44.9
1957	126,200	88,472	48,727	55.1	39,745	44.9
1956	115,200	80,700	43,700	54.2	37,000	45.8
1955	117,036	81,374	45,578	56.0	35,796	44.0
1954	88,312	61,354	35,585	58.0	25,769	42.0

1. 1954-1956, American Iron & Steel Institute; 1957-1964, Battelle Memorial Institute.
2. 1954-1955, Bureau of Mines; 1956, BDSA estimate; 1957-1959, Battelle Memorial Institute.

Congress Gets Scrap Survey

THREE MAIN conclusions are drawn in the Commerce department-Battelle Memorial Institute report on ferrous scrap just delivered to Congress:

1. A prospective decline in supplies of heavy melting grades may force users to depend more on bundles. 2. In case of a sustained national emergency, a serious scrap shortage could result. 3. More study of the scrap situation

U. S. Scrap Use

(Thousands of net tons)

Year	Total	Heavy Melting	Per Cent of Total	Bundles	Cast Iron[1]	Other
1956[2]	80,700	32,280	40.0	10,330	12,024	26,066
1955	81,374	32,431	39.9	10,671	12,328	25,944
1954	61,354	24,936	40.6	7,281	9,485	19,652

1. Except borings. 2. BDSA estimate.

U. S. Scrap Exports

(Thousands of net tons)

Year	Total All Grades	Heavy Melting Scrap	Per Cent of Total	Baled Sheet Scrap	Borings, Shovelings & Turnings	Cast Iron Scrap	Other Scrap
1956[1]	6,000	3,504	58.4	1,548	78	810	60
1955	4,955	3,039	61.3	1,313	100	437	66
1954	1,588	1,076	67.8	360	15	102	35

1. Estimated. Source: Bureau of the Census.

is needed, especially before making any decision to cut off scrap exports.

Reasons—An important bearing on the trend of further study are these statements:

1. The magnitude of the prospective drop in the potential supply of heavy melting scrap points clearly to the necessity for reducing domestic and foreign dependence on this type.

2. Continuing high use of heavy melting (which could make for uncertain supply) could eventually have an adverse effect on the steel industry, particularly on nonintegrated producers, and bring cutbacks in plans to expand electric furnace capacity. In fact, says the Commerce department, the point already may have been reached where annual use of heavy melting is already exceeding potential additions to supply.

Mobilization — The Commerce department plans meetings with steel and scrap industry management to check the outlook for the mobilization supply of scrap and what can be done to maintain and strengthen that mobilization base.

The department also points out that expansion plans in the United Kingdom and European Coal & Steel Community will result in increased scrap requirements from the U.S. Recommended are discussions with those countries to deal with the short range problem of scrap supply and to draw up a longer range program to decrease their dependence on the U.S. for scrap.

The Debate—The scrap report is sure to add ammunition to the complex controversy on policy that has been raging for several years. Last week, the four protagonists were flyspecking it for proof to support their various positions.

1. Congressmen and mobilization officials believe supplies of the right kinds of scrap may be insufficient in wartime. 2. Scrap users contend that high exports can lead to inadequate supplies and high prices. 3. The scrap industry believes that we have an exportable surplus and that some exports are necessary to keep the industry healthy. 4. Foreign users, often supported by the state department, say they need U.S. scrap to keep their industry rolling.

Chicago Has Growing Plans

Inland Steel official says the area will step up steel capacity 9 million tons or more by 1967. Growth is spurred by geography, coal's availability and waterway developments

CHICAGO area steel mills will have an annual capacity of 33 million tons or more by 1967, Hjalmar W. Johnson, vice president of steel manufacturing, Inland Steel Co., Chicago, told members of the Blast Furnace & Coke Association of the Chicago district.

In 1904, the area had a capacity of 1.7 million tons. Currently, it is 24 million tons. On the basis of work in progress, the total will climb to 27 million tons in the next two years.

Mr. Johnson attributes this growth to Chicago's location: It's in the heart of the world's greatest agricultural area and is on the Great Lakes. Impetus to expand comes from two sources: The linkage of the Great Lakes and the Mississippi Valley waterway systems in the next four or five years and the St. Lawrence Seaway.

Coal Plentiful — Use of Illinois and Indiana coal by steel mills will be stimulated by improvement of the inland waterway system, Mr. Johnson continued. Having these coal fields adjacent means that fuel will always be cheap and plentiful in the area. Economical fuel means low cost for electrical power and for steel's new tool, oxygen, he pointed out.

A tremendous amount of research on steelmaking processes indicates that new tools and different materials will come into use in the next ten years, Mr. Johnson said. But, he added, these changes will be evolutionary, not revolutionary.

"For many years, all of us have been interested in methods of producing metallics other than through a blast furnace, and many companies have been working in this field. I believe that ten years from now some of these processes will be in commercial operation in this area, not as a primary source of metallics, but supplementing the metallics being produced in integrated plants."

Bosh Lining—E. K. Miller Jr., assistant division superintendent, blast furnace department, United States Steel Corp., Gary, Ind., described the design and operation of the Gary No. 10 blast furnace which has a carbon bosh lining. (It was installed in 1954.) The furnace is still going strong after more than two years. It has produced over a million tons of iron on the lining.

Exponents of the carbon bosh say these advantages offset its higher installation cost: 1. Smoother furnace operation, with tuyeres working easier. 2. Elimination of cooler troubles. 3. Large furnace working volume and fuel saving.

Taconite—Blast furnace operators apparently think ⅜-in. is the best diameter for taconite pellets used in the blast furnace, said E. W. Davis, metallurgical consultant, Reserve Mining Co., Silver Bay, Minn. The company is concentrating on that size at its new plant.

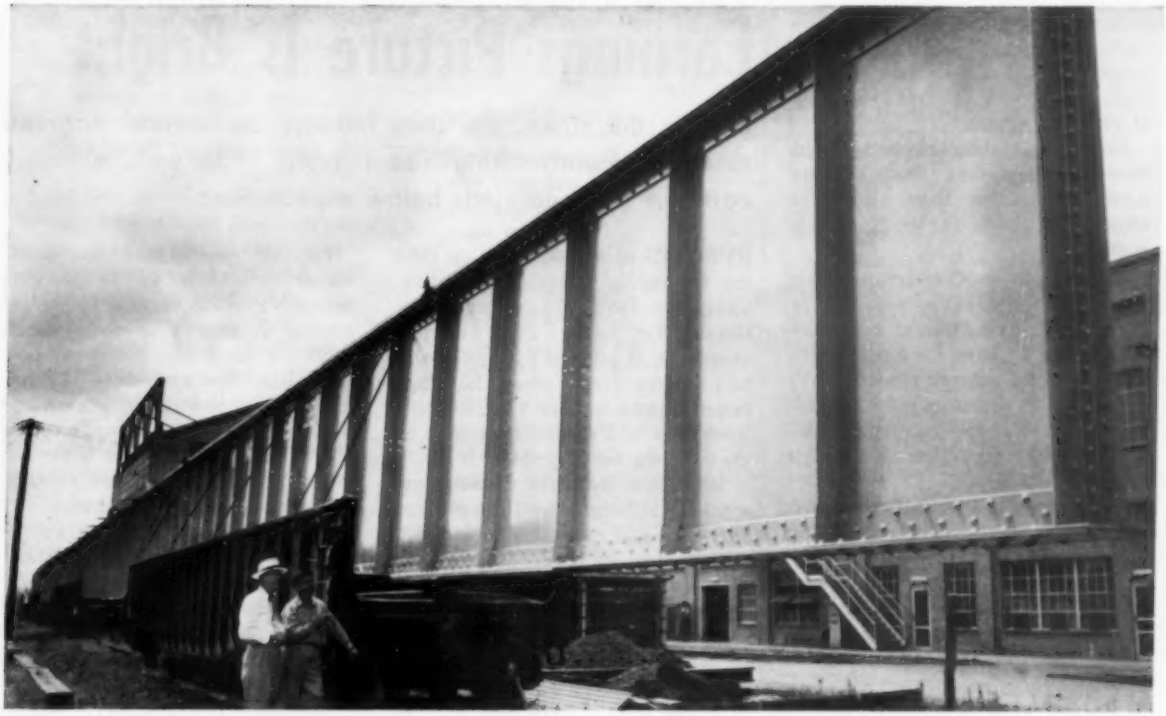
Aluminum Pipeline for Colombia

A 42-mile aluminum pipeline will be installed through a portion of eastern Colombia's remote jungle area to link Colombian Petroleum Co.'s Tibu oil field to the firm's tank farm at Rio de Oro.

Said to be the longest aluminum pipeline ever assembled, the 6-in. unit was manufactured by the Reynolds Metals Co. The pipeline was shipped to Colombia in 40-foot sections from Reynolds' Phoenix, Ariz., extrusion plant on Feb. 1.

Colombian Petroleum's vice president, John Bower, said the pipeline will be in operation a year ahead of the time it would take to install a steel unit because of the ready availability of aluminum pipe and its greater ease in handling and welding.

Colombian Petroleum is a jointly owned subsidiary of Socony Mobil Oil Co. and the Texas Co.



Gray Market in Steel?

There has been a little buying of plates and structurals at premium prices by small consumers, but large users are holding the line against an organized gray market

IT TAKES two to make a gray market: A seller and a buyer. There are plenty of sellers (offering hard-to-get plates and structurals), but, as yet, few buyers.

Consensus — Large consumers hold no ill will against brokers offering premium steel these days. The law of supply and demand is at work. Smaller consumers who are working against contract deadlines sometimes pay premium prices. Many times these consumers ordinarily buy little from mills or warehouses. There appears to be little evidence of an organized gray market.

The tonnage of steel moving at premium prices is probably exaggerated because sellers offer the stuff to the highest bidder. One sale thus becomes known to several potential buyers before the haggling is finished.

Chicago—Big consumers are receiving telephone offers for plates and structurals at 10 to 14 cents per pound, about double the mill price. Calls are coming from Milwaukee, Cleveland, Pittsburgh and New York. The deal generally calls for steel f.o.b. at the seller's city. The Chicago firm would pay the premium, plus the freight charge.

Pullman-Standard Car Mfg. Co. cites these reasons for not buying premium steel: 1. The firm contracts for its job at a price which cannot be raised because of increased material costs. 2. You can't depend on the quality of the steel offered. 3. Most of the time, the steel offered is not the type and quantity needed.

Source—Most industry sources suspect foreign steel is the major offender. One Chicago fabricator was recently offered 1000 tons of Japanese plates to be barged up the Mississippi river at 9 cents per pound. Usually the sellers are vague as to where the steel comes from.

That helps to keep the premium market in check: "We like to know what mill our steel comes from," comments a Pittsburgh purchasing agent.

There's an inflationary spiral here that must be watched, warns a Chicago fabricator. It's the small consumer who is buying premium steel and passing the cost along to his customer.

New York—Although it may be the same sort of premium business that is going on in the Chicago area, New York consumers tend more to call it a gray market than any other area in the country. Nevertheless, it's still a small percentage of the total tonnage moved.

One large ship repair yard admits it has gone into the "gray" market for the first time to ob-

tain heavy plates. A large Baltimore buyer complains he can't buy shapes from the mill, but can get that mill's shapes from brokers at premium prices.

Domestic plates are being sold through conversion deals. Some Australian plates have also been offered, in addition to European tonnage.

Pittsburgh — Conversion deals are being generally refused in Pittsburgh. One large manufacturer with a heavy need for plates in the second quarter reports making a deal at premium prices. Pittsburgh buyers are receiving telephone calls from sellers in Chicago and Philadelphia.

With more calls coming in daily, purchasing agents are concluding that the market is gradually becoming softer — even in heavy plates and structurals. They are holding down purchases at premium prices to a minimum.

Highway Speed—The push on highway construction equipment makers which was generated by the federal highway program has forced at least one Chicago manufacturer into the premium market for plates and channels. He admits paying 100 per cent over the mill price for these items, but says he must do it or lose business to other equipment makers.

'56 Uranium Production Up

U. S. production of uranium ore and uranium oxide during the last half of 1956 more than doubled that of the same period in 1955, reports the Atomic Energy Commission.

In its 21st semiannual report, the AEC said 1,660,000 tons of ore were produced in the last six months of 1956, against 840,000 tons for the final half of 1955. The commission estimates there are approximately 60 million tons of known ore reserves currently in the U.S.

Some 12 privately owned mills, with an annual capacity of 8960 tons, produced 3400 tons of uranium oxide in the last half of 1956, compared with 1600 tons for the same period in 1955.

Operational cost in 1956 was $1,607,973,000, a rise of $318,438,000 over the 1955 figure of $1,289,535,000.

Earnings Picture Is Bright

Despite the strike, the steel industry set several earnings records. Metalworking also finished 1956 well, although costs cut some earnings below expectations

REPORTS of net earnings in 1956 are bolstering steelmakers' enthusiasm for 1957. Thus Eugene G. Grace, Bethlehem Steel Corp.'s chairman, is puzzled by pessimistic talk about steel, when he "has never known a period when steel producers had as much tonnage on their books as they do today."

Mr. Grace looks for capacity operations through the first half of the year, and expects a record output of steel in 1957. Bethlehem's close to $20-million drop in profits from 1955 to 1956 (see table) was largely a result of the steel strike. It ran at 91.6 per cent of capacity in 1956, compared with 98.5 per cent in 1955. Last year's sales were $2.3 billion, compared with $2.1 billion in 1955.

Big Steel—U.S. Steel Corp. also suffered from the strikebound third quarter of 1956: Earnings for the year were off about $22 million from 1955's. Chairman Roger M. Blough sees good months ahead, however. The first quarter should see the industry operating "pretty close to capacity." He adds: "There may be some moderation in pressure for deliveries in the second quarter, but I still think it will be a good quarter, both for U.S. Steel and the industry."

Production in 1956 was at a rate of 85.2 per cent of capacity, compared with 1955's rate of 90.8 per cent. Sales were $4.2 billion in 1956, compared with $4.1 billion in 1955.

Best Year—The third member of the industry's big three, Republic Steel Corp., reports sales were a record $1.2 billion last year. Operations were 91.1 per cent of capacity, compared with 1955's 97.1 per cent.

C. M. White, chairman, backs up Mr. Blough's and Mr. Grace's optimism with this statement: "Current operations are at a high level, and the outlook for the immediate future is for continued good business."

Two of the next three steelmakers (ranked by steelmaking capacity) also turned in better profits in 1956 than they did in 1955. Youngstown Sheet & Tube Co.'s earnings and sales set records, while operations were at 94 per cent of capacity, compared with 1955's rate of 100.9 per cent. National Steel Corp. boosted its earnings and set a sales record.

Jones & Laughlin Steel Corp.'s earnings were down about $5 million; the operating rate was 97 per cent, compared with 100 per cent in 1955. Chairman Ben Moreell estimates the strike cost the firm $10 million in net income.

Records—Inland Steel Co. reports both earnings and sales established records. Sales were up 10.2 per cent to $727 million. Over half of Armco Steel Corp.'s employees remained on the job during the strike to enable the company to set production records in 1956. Sales hit a record $762 million.

Wheeling Steel Corp., the nation's tenth largest steelmaker, reports its earnings were the second highest in history; sales reached a record $247 million.

Fourth quarter figures for Acme Steel Co. are significant because they include the business of Newport Steel Corp., acquired by Acme last September. Sales were up 50 per cent from 1955's; earnings increased about $500,000. For the year, Acme racked up a sales record (21 per cent above 1955's). Acme looks for an improved earnings picture in 1957.

Other Metalworking

It's easy to see the high and low spots of last year's economy: Check these industry representatives:

Electronics—International Business Machines Corp.'s earnings were up 23.1 per cent, adding up to a record. Gross income (including sales, service and rentals) advanced 30.3 per cent for another

record. Despite record production last year, notes President Thomas J. Watson Jr., unfilled orders remain at a high level.

The year end's backlog of American Electronics Co. Inc. stood at about $10 million, compared with $6.5 million at the end of 1955.

Dresser Industries Inc. serves the oil, gas, chemical and electronics industries. Sales were hiked 35 per cent in 1956; earnings jumped 58 per cent.

Chemicals — Hercules Powder Co. reports record sales, but higher wages and material costs cut profits below 1955's. Sales of Union Carbide & Carbon Corp. also were record breaking (8 per cent over 1955's), while earnings gained little.

Automotive — Col. Willard F. Rockwell, chairman, Rockwell Spring & Axle Co., attributes his firm's decline in sales and profits last year to "lower passenger car production and declining defense business." Rockwell's backlog is 12 per cent above what it was at the end of 1955. Budd Co.'s sales were off about $9 million in 1956.

Sales and earnings of Fruehauf Trailer Co. failed to meet earlier expectations, notes Roy Fruehauf, president. But business for 1957 looks "tremendous." The highway program, piggybacking and fishybacking provide the rosy glow for this firm. Another factor: Fruehauf's military backlog has doubled in the last six months.

Equipment — Fred C. Foy, prespresident, Koppers Co. Inc., says the company has a backlog of $164 million, compared with $127 million a year ago. Arthur G. McKee & Co. more than doubled its earnings in 1956. Its backlog is the highest in the company's history. Air Products Corp. almost doubled its earnings, while sales jumped to $20.5 million, compared with $10 million in 1955.

Appliances—Zenith Radio Corp.'s earnings dropped in 1956, but were still the second highest in the firm's history. Rheem Mfg. Co. reports sales gained $13 million last year.

Farm Equipment — International Harvester Co. suffered a $6-million drop in earnings, although sales were up. I-H officials foresee some improvement in farm equipment sales this year.

Good Net Earnings for Steelmakers Despite Strike

SELECTED STEELMAKERS	1956	1955
Acme Steel Co.	$ 6,723,000	$ 6,172,000
Alan Wood Steel Co.	3,096,000	2,552,000
Allegheny Ludlum Steel Corp.	15,261,090	14,985,660
Armco Steel Corp.	65,250,000	64,350,609
Barium Steel Corp.	6,560,000	655,318
Bethlehem Steel Corp.	161,411,625	180,191,708
Copperweld Steel Co.	3,440,872	2,365,459
Crucible Steel Co. of America	12,767,625	13,208,602
Granite City Steel Co.	15,109,000	12,611,000
Inland Steel Co.	52,998,726	52,466,098
Jones & Laughlin Steel Corp.	45,122,000	50,104,000
National Steel Corp.	52,502,422	48,289,453
Pittsburgh Steel Co.	6,225,000	7,515,470
Republic Steel Corp.	90,406,665	86,271,491
U.S. Steel Corp.	347,865,150	370,099,353
Wheeling Steel Corp.	17,672,000	17,296,000
Youngstown Sheet & Tube Co.	43,174,587	41,701,140

Metalworking's Net Earnings Ease Upward

SELECTED COMPANIES	1956	1955
Acme Precision Products Inc.	$ 470,595	$ 101,738
Air Products Corp.[1]	1,407,279	776,509
American Brake Shoe Co.	8,963,000	6,442,000
American Can Co.	34,824,096	35,989,700
American Electronics Co. Inc.	365,000	265,013
American Zinc, Lead & Smelting Co.	3,227,864	2,592,232
Budd Co.	9,165,274	13,790,578
Carborundum Co.	6,327,758	5,187,055
Cleveland-Cliffs Iron Co.	13,902,569	13,394,332
Commercial Shearing & Stamping Co.[2]	1,740,393	802,089
Container Corp. of America	18,200,000	16,411,491
Cooper-Bessemer Corp.	4,842,202	1,750,227
Detroit Harvester Co.[1]	1,599,681	582,700
Diamond Alkali Co.	10,380,141	8,442,908
Dresser Industries Inc.[2]	17,259,000	10,904,000
Gar Wood Industries Inc.[2]	1,006,122	793,549*
General Fireproofing Co.	5,077,000	3,870,000
General Steel Castings Corp.	3,149,874	2,338,106
Hercules Galion Products Inc.[1]	538,707	73,273
Hercules Powder Co.	17,703,000	19,013,000
International Business Machines Corp.	68,784,510	55,872,633
International Harvester Co.[2]	49,618,709	55,501,272
Kennecott Copper Corp.	142,588,137	125,516,291
Koppers Co.	12,096,413	10,414,877
Lamson & Sessions Co.	2,521,339	2,417,836
Magma Copper Co.	7,475,827	6,227,571
Arthur G. McKee & Co.	2,010,000	934,589
H. K. Porter Company Inc.	7,594,534	6,433,107
Progress Mfg. Co. Inc.	1,280,000	1,052,080
Rockwell Mfg. Co.	9,288,000	6,795,000
Rockwell Spring & Axle Co.	11,600,000	17,310,485
Saco-Lowell Shops	1,963,167	1,375,768
Savage Arms Corp.	1,215,022	1,081,179
Servel Inc.[2]	1,833,217*	4,047,292*
Union Carbide & Carbon Corp.	146,233,444	145,834,416
Victor Equipment Co.	642,299	481,439
Westinghouse Electric Corp.	3,492,000	42,802,747

1 Fiscal year ended Sept. 30.
2 Fiscal year ended Oct. 31.
*Loss.

Atom Planes Sacrificed To $$, Charges Congress

ATOMIC aircraft development is under fire in Washington. Congressional sources say the project has been slowed down, and they are calling defense officials to Capitol Hill for an accounting. The Pentagon is putting dollar signs before defense, they charge. Putting some weight behind the charges: Research and development costs for atomic aircraft are figured in the fiscal 1958 budget at $91 million, up only a little from this year's $89.6 million. This is almost double the 1956 figure ($49.6 million) and more than four times 1955's $22.6 million.

Call for Half of Estimated Cost

If present plans are carried out, it means that at the end of fiscal 1958 about $300 million will have been spent on research and development (termed R&D). That is maybe half the estimated cost of putting an atomic plane in the air (estimates are between $500 million and $1 billion). It means that atomic aircraft are still three to five years away unless Congressmen can get action. Pentagon officials are expected to claim: 1. At the present state of development, the first atomic plane would probably be subsonic because of heavy reactors and shielding. They advise: Better to wait until a supersonic craft can be developed. 2. Not enough is known about the effect of radiation on structural materials. 3. A speedup in the program would further intensify the competition for engineers and scientists.

AF Wants More Research Funds

The Air Force undoubtedly will be strongly in favor of more R&D funds for atomic planes or other purposes. One of the AF's strongest gripes about present budget estimates is the failure to provide it with more R&D money; in fact, some cutback in appropriations is called for. Reportedly, the flyers would accept their planned allotment for aircraft buying in better graces if they were granted a goodly boost in R&D monies.

40 Per Cent of Hoover Report

About 40 per cent of the recommendations of the second Hoover Commission have been put to work and will eventually save more than $562 million a year—but the chance for really big savings still lies ahead. That was the consensus of the Citizens Committee for the Hoover report meeting in Washington.

Studies Recruiting Cost

The Pentagon plans a crackdown on recruiting allowances of government contractors in response to congressional charges that taxpayer money is being used to "pirate" engineers. To be set up are "practical criteria" to determine recruiting allowances and a technical manpower utilization committee to see if scarce engineers are being wasted by industry. A Navy study showed: Some $6.4 million was spent by 37 selected defense contractors to recruit 4859 engineers and technical employees, an average cost of $1317. Seventeen firms with no defense contracts averaged $985 for 623 new employees.

Straw in the Wind

• Aluminum scrap dealers want the government to consider lifting restrictions on exports in the second quarter and raise the 5000-ton first quarter quota.

Meet Dr. Hal G. Johnson: He's on loan to the government as director, Chemical & Rubber Division, Business & Defense Services Administration. His regular job is director of general development, Research & Enginering Division, Monsanto Chemical Co. Contact him in Washington at Commerce department, room 4425. Phone STerling 3-9200, ext. 4843.

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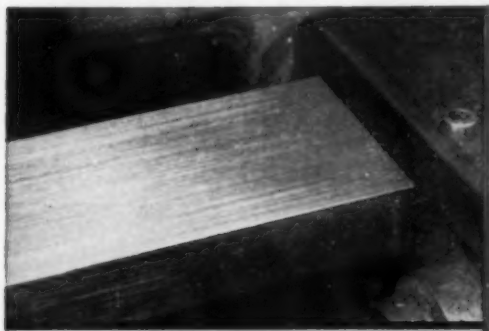
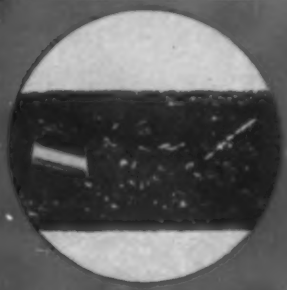
guards the life, cuts downtime, saves costly maintenance on machine tool ways

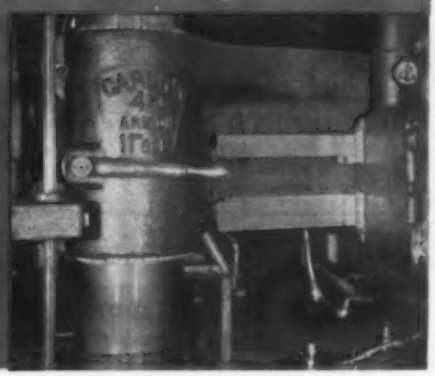


This close-up photograph shows harmful chips and abrasives trapped in a fibrous wiper that permitted scoring of the lathe way shown at left.



The extent of scoring and abrasion caused by chips trapped under the carriage is clearly shown in this photograph of a lathe way.

C/R Way Wipers are quickly, easily installed on this milling machine, as well as on shapers, grinders, planers, and gear cutters.



The clean, score-free wiping action of C/R Way Wipers is evident again in this partial view of a radial drill. Note how close, accurate lip contact on the column is achieved, even though the wiper is mounted on uneven surfaces.

How many hundreds of dollars are scoring and abrasion of machine tool ways costing your shop each year . . . dollars that could easily be saved? C/R Sirvene (synthetic rubber) Way Wipers make it unnecessary to tolerate this expensive damage. They are designed and precision molded for an extremely accurate fit. They will *not* trap harmful materials . . . will not mark or smudge ways. They will wipe ways clean of dirt, chips, fine abrasives . . . even water emulsions . . . yet leave a thin, protective oil film. C/R Sirvene Way Wipers will fit flat ways, side rails, angles, columns and hydraulic rams . . . and are easily installed. They will save you many times their cost. Please write for illustrated brochure that gives complete details.

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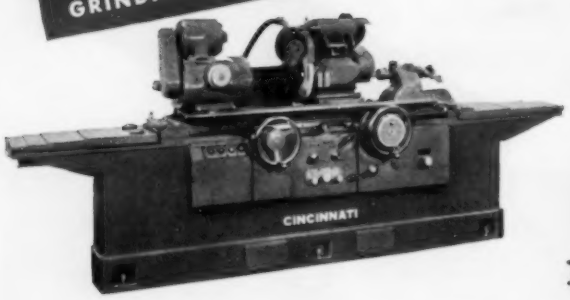
reduce cost of your small lot precision grinding



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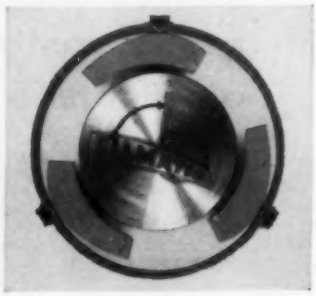
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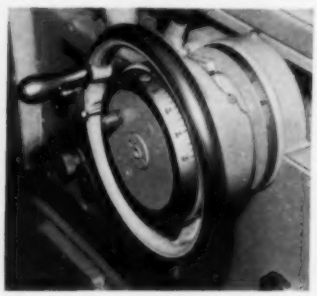
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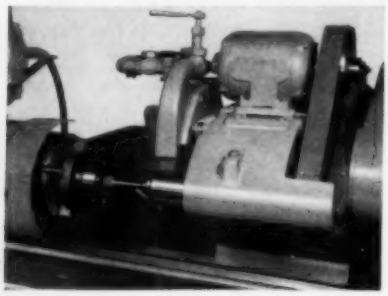
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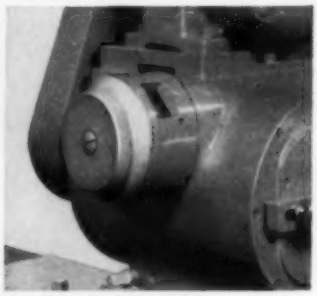
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Small manufacturing quantities may be good for inventory accounting, but they're tough on costs. In precision toolroom grinding, CINCINNATI® FILMATIC Universals offer several ways to eliminate or greatly reduce the setup element of cost.

1 **Power rapid positioning** of wheelhead. Saves time and energy, especially when setting up for widely varying diameters (extra equipment).

2 **FILMATIC grinding wheel spindle bearings** require no adjustment for any job assigned to the machine.

3 **Two-speed cross feed mechanism** facilitates multiple diameter grinding; incorporates pickfeed all the way to final size.

4 **Internal grinding unit** is hinged at the front of the wheelhead casting, always ready for internal work.

5 **Instant work speed selection** for the diameter being ground. Just turn the dial with one hand, that's all there is to it.

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Management at Work

L&N's Fiske: Let Them Rate Each Other

SUPERVISORS are often in a better position than their superiors to evaluate the performance of other supervisors.

"That's part of our philosophy at Leeds & Northrup Co.," says Edward R. Fiske Jr., manager of personnel development for the Philadelphia firm.

"In our appraisal-counseling sessions—the core of our management development program—we encourage the selection of one or two members of the appraisal group who are of the same rank as the individual being appraised."

Know More — Supervisors have day-to-day contacts with each other. They are apt to know more about each other's strengths and weaknesses than managers who see them less often.

"Using peers as appraisers has worked well at L&N," emphasizes Mr. Fiske. "It has widened participation in the program. Supervisors have consistently made valuable contributions to appraisals. This has helped them gain a better understanding and appreciation of the appraisal-counseling program."

Once a Year—Most departments at L&N seek to appraise each supervisor about once a year. The appraisal group is generally made up of four persons. The chairman is the immediate superior of the individual being appraised. Others include one or two of the appraisee's peers and one or two people from higher management.

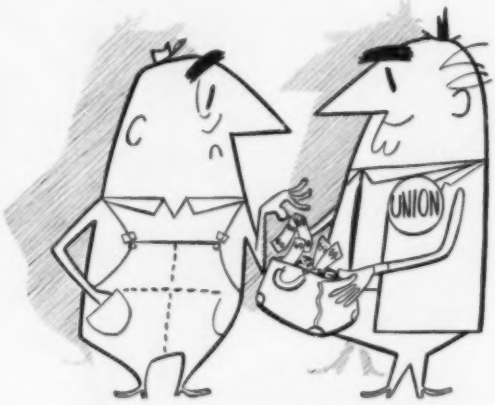
Objective of appraisal-counseling is to help the individual improve his performance. In the appraisal session, all strengths and weaknesses of the individual are discussed. All points must have the unanimous approval of the appraisers to get into the written report that follows. The written report is discussed in private by the individual appraised and his immediate superior.

Backstops Management—On occasion, relates Mr. Fiske, these appraisals have backstopped management by raising the question of whether the individual is properly placed in his position. More than once an appraisal has suggested a transfer—from supervisory to administrative or technical staff duties—which has been to the advantage of the company and individual.

A mechanical engineer, Mr. Fiske joined L&N right after graduation from Cornell University. During World War II, he was a major heading the military publications branch of the Office of the Chief of Ordnance.

A firm believer that management people should participate in community activities, he is an officer of a boys' club. "At home," he says, "I also try to do some personnel development—with my two sons."

Ferment in Labor: Dues



Union	Monthly Dues
Steelworkers	$5.00
Auto Workers	3.00*
Mine Workers	4.25
Machinists	4.00
Electrical Workers (AFL-CIO)	3.00

*Minimum under proposed 50-cent boost.

Ferment in Labor: Skilled Trades

Skilled Work Force	
In 1965	10.5 million (needed)
In 1956	8.5 million
In 1955	8.3 million
In 1954	8.2 million

Sources: Departments of Commerce and Labor.

Labor Ferment Rising

TOMORROW (Feb. 12) the United Steelworkers of America votes for a president in one of the most bitterly contested elections in the history of the union.

SOON, the United Auto Workers hopes to crush the splinter organization, Society of Skilled Trades, at a representational election at the Marion, Ind., plant of General Motors Corp.

"SOUTHERN Federation of Labor (the splinter group that threatens to break away from internationals over the segregation issue) is very much alive," claims Elmer B. Brock, chief organizer.

Those three dissimilar situations have a common denominator: They indicate unusual unrest in the ranks of labor, a paradox at a time when the AFL-CIO is starting its second year of unity. The trade union movement shows many other evidences of discord (lack of cohesion among local and state AFL and CIO groups, for example), but the three are among those containing the greatest threat of trouble for management.

What are they all about? Why should you concern yourself about them?

Rarick Rebellion

Don Rarick, 37-year-old steelworker from McKeesport, Pa., hasn't a chance of winning the presidency of the steel union from Dave McDonald.

The challenger can claim the support of only 91 locals; the incumbent, Mr. McDonald, has the rest, more than 1000. Yet, the vehemence of the campaign against the Rarick Rebellion by the union regulars indicates how seriously they regard it.

Mr. Rarick is a symbol of protest. He started out, he told STEEL, merely to complain about what he considered "rigged approval" of the dues boost last fall at the union's annual meeting in California. His role as a delegate to the convention and membership on the grievance committee at the Irvin Works of U.S. Steel Corp. are the only union offices he has ever held.

He had the courage to protest the $2-a-month rise in dues and is

still slightly bewildered at what it has led to. Besides people who don't like the rising cost of union membership, he numbers among his supporters southern white steelworkers disturbed about integration policies, members who don't like terms the McDonald regime has won in contract negotiations and others simply disgruntled with the party in power for varying reasons.

The Rarick Rebellion is a ground swell revolt, not a result of power politics. It's a fight for more democracy in the labor movement. Mr. Rarick can't win the presidency, but the fact that he's running is a good sign. Says one observer: "It will be good for unionism if Mr. Rarick makes a fairly good showing in scrupulously honest elections. It will be a step backward if he is overwhelmed and if irregularities turn up in the voting. Management would have more trouble, too. A union that turns to trickery in its own affairs would find it even easier to justify shenanigans in dealing with employers."

Craft Crusade

The UAW has just about overwhelmed the Society of Skilled Trades (SST), the splinter group organized in Flint, Mich., in 1955 because of dissatisfaction by skilled workers in the UAW over the settlement that year. SST is making a last-ditch stand to stave off collapse by transforming itself into a kind of co-ordinating group for a number of small, independent craft unions, one of them being International Association of Tool Craftsmen (IATC).

IATC, headquartered in Rock Island, Ill., was formed several years ago, and claims a membership of about 1000 and bargaining rights in ten plants. SST hopes the alliance will be a central force around which a new craft movement can be started.

How strong that new setup will be may soon get tested. IATC has requested a representational election at Fisher Body stamping plants in Marion, Ind., and Mansfield, O. The Marion election, if O.K.'d, would determine whether the UAW or IATC should represent 390 toolroom people. The UAW is anxious for a showdown, claims 90 per cent of the personnel.

The UAW is confident because of two moves it has made to woo the apprenticeable skilled trades. In a December meeting of its Skilled Trades Department, top brass of the union proposed that: 1. Supplemental agreements to the master auto contracts be negotiated for skilled trades only. 2. Skilled workers be permitted to ratify their portion of the general contract separately. 3. Skilled workers be permitted to elect their own representative to the union bargaining committee.

The second move came last month when the UAW's National General Motors Council conference voted to change the membership plan for its administrative council and subcouncils to guarantee at least two skilled worker representatives on an 11-man governing board. "Formerly," says Leonard Woodcock, UAW vice president and director of the GM Department, "membership was on a geographical basis. Now it will be on a functional basis. Under the old setup, we always had skilled men on the board, but it was happenstance. Now we're assured of at least two —from the tool, die and maintenance group and the design, engineering and model pattern group."

Those two moves to woo the skilled men in its ranks mark a dramatic departure for UAW, long the champion of the industrial, catch-all form of organization as opposed to the craft concept.

It's compromising because it sees the ranks of apprenticeable skilled trades steadily growing. In the machining plants of GM, for example, some 18 per cent now are in skilled categories; 7 to 8 per cent in assembly plants. Those percentages have already grown markedly in the last decade.

The GM Department proposal (which is a good bet for approval at UAW's April convention) sets up fractionated groups—for Chevrolet assembly, Fisher body assembly, Fisher stamping, accessories and parts, foundry and forge, heavy equipment, Buick-Olds-Pontiac divisions, assembly manufacturing and motor and bearings, transmissions and axle, plus the two skilled groups. Only the last two would have the right to supplemental contract terms, but the other nine could win that too. Should this revamping prove successful in GM, other big company councils (notably Ford and Chrysler) will be organized similarly. Ford is already part way along that road.

That all adds up to trouble for management — more complicated contracts, more prolonged bargaining, more difficulty in reaching agreements.

Southern Secession

The White Supremacy issue is still decidedly popular and alive in the southern labor movement, but it's not yet being translated into an effective separate organization.

The movement to form a Southern Federation of Labor is alive but underground. Only one of the ten leaders (Mr. Brock) would talk to STEEL for the record. No one of the ten can—or will—estimate how many workers SFL has signed up. They make claims for no unions or locals in the South that have broken from their internationals. Indeed, they urge sticking with present affiliations until "we are strong enough."

With the exception of leadership in Alabama, the general SFL direction is weak, split into factions. One interesting point: SFL is trying to make hay on some issues having nothing to do with integration—the dues question in steel, union bigness in the UAW, alleged corruption in the teamsters.

Consensus: SFL will go nowhere but the integration question is dynamite, and SFL agitation serves to keep it at a constant state of near explosion. And that's no help to management.

Conclusion

Ferment is working up in organized labor. "The merger of the AFL and CIO," says one union official, "put the cork in the bottle." But will pressure on top keep everything under control?

If not, management, a close bystander in many cases, may get caught in the explosions.

• An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.

How Great Lakes Steel *teems* quality

You're up on the catwalk above the pouring platform along the open-hearth pit at Great Lakes Steel. Right below, one of the giant 250-ton teeming ladles is filling another train of hot-top ingot molds.

At no step in the production of good, deep-drawing steel is control of quality more important than in the teeming operation. For defects can easily develop *unless* the entire pouring operation is done exactly right . . . the way it is at Great Lakes.

For example, these hot-top molds are designed to eliminate shrinkage cavities in the finished product. A special lining compound of graphite or tar blankets the inside of every mold to form a highly protective shield for the delicate ingot surface.

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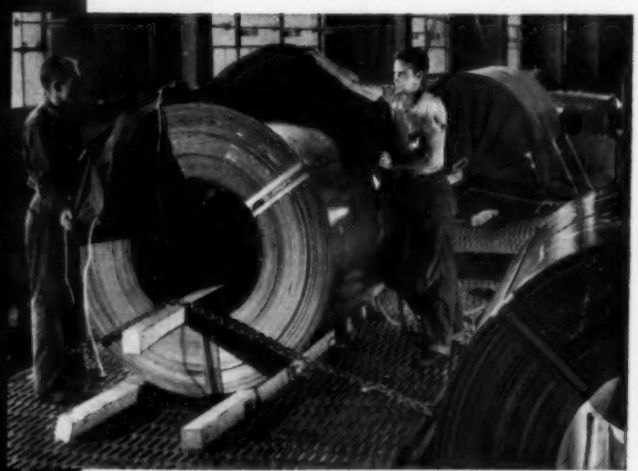

BUILT-IN QUALITY of Great Lakes steel is guarded through every step to final delivery. Here shipments of flat-rolled sheet coils are covered with tarpaulins for protection.

First Quarter Auto Output

(Thousands of units)

	1957 January*	1957 February**	1957 March**	1st Qtr. 1957 Total**	1st Qtr. 1956 Total
General Motors Corp.	308	270	285	863	967
Ford Motor Co.	195	170	190	555	441
Chrysler Corp.	124	118	112	354	254
American Motors Corp.	6.3	8.5	9.2	24	42
Studebaker-Packard Corp.	5.7	6.1	8.2	20	39
Totals	639.0	572.6	604.4	1816	1743

*Preliminary.
**Estimated by STEEL.

Auto Sales Belie Rumors

Production and sales gains in the industry mean sudden death for gloom hounds who predict a big slump for automobiles; sales are moving up

PRODUCTION and sales in the auto industry are knocking the wind out of rumors that 1957 will not live up to expectations.

Output is running about 5 per cent ahead of the mark for the same period in 1956.

The sales average of the industry is from 12 to 14 per cent better than that of the first part of 1956.

And don't forget: There was a 15 per cent sales slump following new model introductions.

Midwinter Blues—Why the pessimism? Most of it has stemmed from Detroit where industry experts have a habit of crying the blues at this time of the year.

Here are some of the rumors that make for a defeatist attitude:

- Sales are off badly.
- Gm has canceled much of its 1958 tooling.
- Production is snarled.
- Tight credit and high prices keep buyers out of the market.
- Auto companies aren't ordering as much steel as they did last year.

There was a grain of truth in such reports, but the picture is beginning to take on a happier hue.

Sales Reports — Chrysler says that in the first 20 days of January (vs. the like period in 1956), Plymouth sales are up 12.7 per cent, Dodge 13.9 per cent, De Soto 18 per cent and Chrysler and Imperial 16.5 per cent.

R. S. McNamara, Ford Co. vice president and division manager of Ford, reports that Ford sales in January are 30 per cent higher than those in January, 1956. Mercury sales in the first 20 days of the month are 13 per cent higher. Lincoln's sales increase is close to Ford's.

General Motors divisions are not releasing sales percentages. Production figures, which indicate sales patterns to some extent, show that GM's plants in the U.S. turned out about 13,000 less units this January than they did last January. Buick had a 13,000 deficit, Oldsmobile a 5000 deficit. Chevrolet is about even. Pontiac and Cadillac are up slightly.

One source estimates that GM's total sales are 14 to 16 per cent lower than last year's.

GM's sales position has caused plenty of talk in the industry. Officials close to Buick and Olds admit that a lack of obvious styling changes has caused some of the sales shrinkage.

GM Tooling—GM has held up some of its forging and tooling programs. Suppliers say division engineers report changes are in the making.

How big and how many aren't clear, but lead times of 10 and 11 months for heavy dies discount the prospect of current large-scale revisions.

Production Snarls — A series of changes in output schedules and overtime work has led many to believe that assembly lines are fouled up, and cars can't be turned out on schedule.

That was true early in the model year, but only a few divisions report trouble now. Current scheduling is upward to fill pipelines which are close to the 30-day (normal) level. Overtime operations are being cut back as assembly problems are licked.

American Motors will schedule overtime to compensate for production losses during its recent eight-day strike. Some Ford and Chrysler divisions will continue Saturday work through February to build up inventories.

Tight Money—Credit is a major question. Finance and loan firms have reported tight money has caused them to turn down many buyers who otherwise would be in the market.

Dr. Sidney E. Rolfe, chief economist for the C.I.T. Financial Corp., N. Y., tells STEEL: "I believe we currently are at the high point of the tight money market for auto financing.

"There now are excessive bank reserves from which additional credit can be established if need arises.

"I suspect the squeeze will be

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eased by March or April. There will be enough auto financing credit available to meet the 6.5 million sales estimate by producers."

Steel Buying—It's true: Auto builders aren't buying as much steel as at this time last year. But there's no threat of a steel strike next summer, as there was last year.

The auto industry is purchasing just enough to keep inventories in balance. That could be the pattern for at least the first three quarters. A surge upward could come in the last three months to get a head start on 1958 model production. But total purchases of the metal in 1957 promise to surpass the 1956 levels because odds are still good that at least 6.5 million cars will be turned out this year, compared with 5.8 million last year.

The purchasing director for a major auto firm says: "Because of the availability of steel, we don't need the inventories we've had in the past. Reducing inventory is a big part of our cost reduction program."

As earlier reported, several of GM's Fisher Body divisions have less than a 30-day inventory of cold-rolled sheets (see STEEL, Jan. 21, p. 50). At least two stamping divisions of other companies are carrying less than a 20-day supply.

Car Dealers Queried

As part of its quarterly auto sales roundup, STEEL questioned auto dealers around the country. Some of their statements highlight area buying patterns.

Cole-Finder Mercury, Chicago: "Although sales are down about 20 per cent from those of a year ago, price is the biggest reason. We have no delivery problems."

Bud Hauser (Plymouth - De Soto), Chicago: "We have had a 100 per cent increase in orders, but we can't get cars fast enough to fill them. Most customers have around a four or five week wait."

Logan Square Nash, Chicago: "Sales so far are up about 40 per cent, with 90 per cent of that attributable to the Rambler. We are bumping into some price resistance. It's about a 30-day wait for delivery."

Ed Stinn Chevrolet Inc., Cleveland: "Sales were not up to expectations in the first two weeks of January, but we are selling well now. We expect to sell as many or more cars than we did in 1956."

Birkett L. Williams Co. (Ford), Cleveland: "Sales are down slightly in January, but the last quarter of '56 was our best in history. We are not getting enough Fairlane 500s and station wagons from the factory. Demand for the Thunderbird is, and has been, higher than factory shipments."

McKean Oldsmobile Co., Pittsburgh: "Our deliveries of '57 models have been slow. We have many orders which have not been filled. We are still taking orders and expect to be able to fill them all."

New York—All dealers indicate sales are off, but agencies hope for a spring pickup. They cite weather, tight credit and the lack of styling changes in Chevy and Olds as reasons for the slump.

Detroit—Area sales average better than 10 per cent above 1956's. There is no price cutting and few delivery problems. Proximity to sources of supply helps Detroit dealers.

Lewis Looks at Atom

The Atomic Energy Commission estimates that work being done with radioactive isotopes would cost industry an additional $200 million if it were performed by other methods, says Dr. Clayton R. Lewis, Chrysler Corp.'s chief engineer for nuclear research.

Dr. Lewis also told SAE members that it would take an 80,000-lb atomic power plant to propel a 3000-lb automobile.

"Of more immediate interest is the fact it appears likely there will be increasing demand for the transportation of highly radioactive fuels and components," he reports.

The auto industry should think about ways and means of building heavily shielded vehicles which can transport such materials.

They may even have to be refrigerated to dissipate the heat generated from radioactive material being carried, he adds.

U.S. Auto Output

Passenger Only

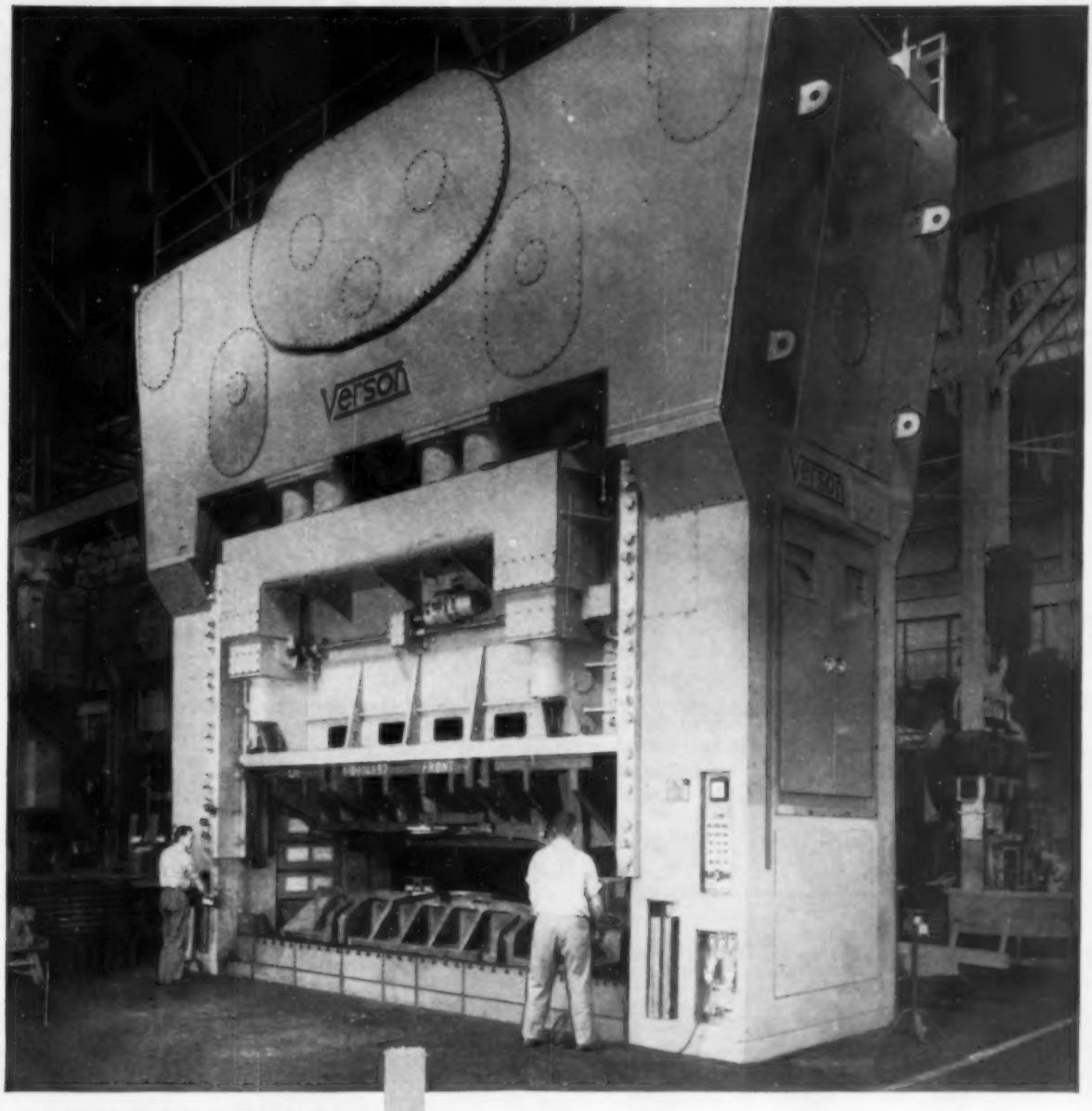
	1957	1956
January	642,090†	611,190
February		554,667
March		575,559
April		547,766
May		471,994
June		430,141
July		448,804
August		401,997
September		190,709
October		388,922
November		581,088
December		597,083
Total		5,799,920

Week Ended	1957	1956
Jan. 5	91,130	125,245
Jan. 12	147,129	149,995
Jan. 19	145,761	144,729
Jan. 26	145,191	135,586
Feb. 2	143,414†	140,582
Feb. 9	144,000*	136,308

Source: *Ward's Automotive Reports.*
†Preliminary. *Estimated by STEEL.

Exhaust Notes

- American Motors Corp. has dropped out of the National Association of Manufacturers. The company suggests that a tight budget and some basic policy differences are the reasons.
- Buick squelches the rumor that some dealers can provide a wrap-around rear window on all models. The GM division says the split rear window still is standard on Special and Century series, optional on the Roadmaster. The wrap-around rear window is available on only the Super series.
- Chevrolet division announces an optional rear axle which will put all power into one rear wheel if the other is slipping on ice or snow. Called Positraction, the device uses disc clutches on either side on the conventional gear and pinion set of the rear axle. The result is similar to that of Studebaker-Packard's noslip differential.
- L. L. Colbert, Chrysler Corp. president, says the corporation will return to a normal three-year major change-over cycle.
- It's rumored that Chevrolet will switch to a cast crankshaft (probably pearlitic malleable) in 1958.
- Lincoln sales in the first part of this month ran 30 per cent higher than they did last year, reports Henry B. Daniels, Lincoln's general sales manager.



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3 WAY
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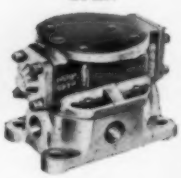

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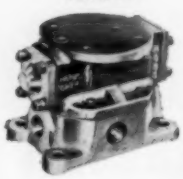

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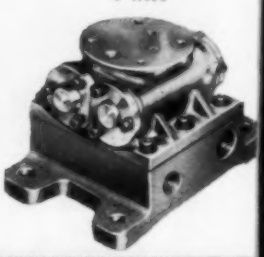

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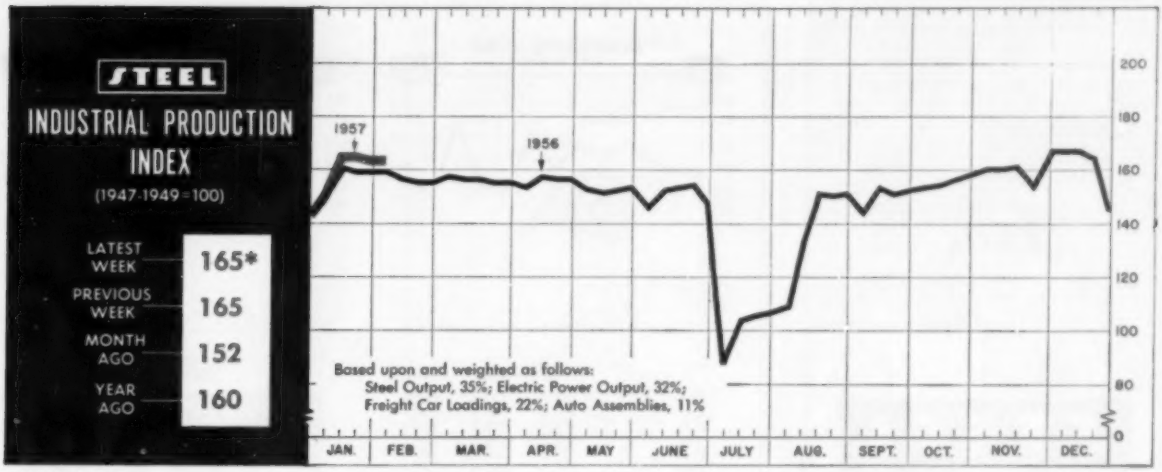


*Week ended Feb. 20

Industry Follows 1956 Business Pattern

METALWORKING faces another year of "high-plateau" activity similar to what it experienced in 1956. It can't go much higher because of capacity limitations, and it isn't likely to go much lower because of heavy backlogs and a large volume of new orders. As in 1956, business trends will show "rolling" adjustments.

Figures for 1956, now almost complete, point up this rolling adjustment feature. Of 38 business indicators published by STEEL periodically on the following two pages, 18 indicate improved business at year end on a month to month basis. Twenty point downward. On a year-ago basis, the score is 19 up, 19 down. For the year as a whole, 26 were better in 1956 than in 1955; 12 were not.

Slippery Figures—Take the same indicators and compare January, 1956, with December, 1955. Only 14 were on an uptrend, 22 were pointing down, and two were even. Only 12 trends were in the same direction in both studies. On the face of it, early 1956 was worse off than late 1956, yet the year as a whole was the best on record for metalworking and the general economy! Explanation: As one economic factor eased off, another rose to fill the gap. Look for more of the same in 1957.

Simple comparisons like those above can be misleading because they ignore long term trends, seasonal variations, a lag in available statistics, dips and peaks which usually appear in any performance chart, capacity limitations and many other variables which can change the picture. For instance, steel operations for the week ended Feb. 10 were estimated by the American Iron & Steel Institute to be at 96.6 per cent of capacity. That sounds like a drop in steelmaking, but that percentage represents 2,472,000 net tons for ingots and castings. Six weeks ago, that would have been 100.4 per cent of the capacity figures then being used. Instead of showing any weakness, steel production is at a near-capacity level.

BAROMETERS OF BUSINESS

	LATEST PERIOD*	PRIOR WEEK	YEAR AGO
INDUSTRY			
Steel Ingot Production (1000 net tons)[2]	2,472[1]	2,498	2,439
Electric Power Distributed (million kw-hr)	12,300[1]	12,410	11,540
Bituminous Coal Output (1000 tons)	10,205[1]	9,880	10,420
Petroleum Production (daily avg—1000 bbl)	7,400[1]	7,396	7,081
Construction Volume (*ENR*—millions)	$406.8	$222.1	$533.0
Auto, Truck Output, U. S., Canada (*Ward's*)	176,249[1]	178,550	174,469
TRADE			
Freight Car Loadings (1000 cars)	660[1]	666	681
Business Failures (Dun & Bradstreet)	258	278	284
Currency in Circulation (millions)[3]	$30,607	$30,827	$30,223
Dept. Store Sales (changes from year ago)[3]	+2%	+2%	+8%
FINANCE			
Bank Clearings (Dun & Bradstreet, millions)	$22,886	$23,600	$21,066
Federal Gross Debt (billions)	$276.5	$276.2	$280.1
Bond Volume, NYSE (millions)	$20.0	$20.3	$24.9
Stocks Sales, NYSE (thousands of shares)	9,048	10,498	9,775
Loans and Investments (billions)[4]	$85.6	$86.5	$85.2
U. S. Govt. Obligations Held (billions)[4]	$26.3	$26.8	$29.5
PRICES			
STEEL's Finished Steel Price Index[5]	225.92	225.92	209.10
STEEL's Nonferrous Metal Price Index[6]	246.8	252.3	267.8
All Commodities[7]	116.9	117.0	112.0
Commodities Other Than Farm & Foods[7]	125.2	125.2	119.8

*Dates on request. [1]Preliminary. [2]Weekly capacities, net tons: 1957, 2,559,490; 1956, 2,461,893. [3]Federal Reserve Board. [4]Member banks, Federal Reserve System. [5]1935-1939=100. [6]1936-1939=100. [7]Bureau of Labor Statistics Index, 1947-1949=100.

Coming Feb. 18 IN STEEL

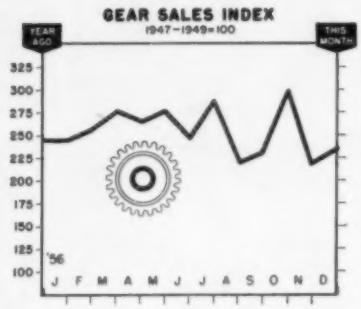
The Short Week

The United Auto Workers says the 30 or 35-hour week will be one of its major demands in 1958. Some smaller unions will be asking for it this year.

What would the short week cost industry? In what form does labor want it—four days a week or shorter hours a day? Why is the UAW so vehement about the issue in an era of labor shortages? What areas of metalworking, besides automotive, are likely to face the demand in the next two or three years? What are management's counterproposals?

STEEL will answer those and other questions next week on a labor matter that promises to rival Supplemental Unemployment Benefits in importance for industry.

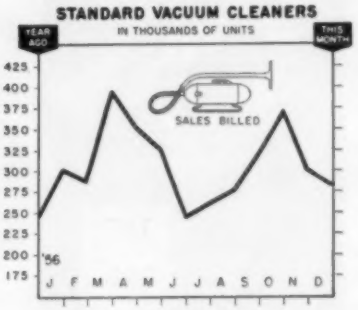
THE BUSINESS TREND



	1956	1955	1954
Jan.	245.5	140.9	167.4
Feb.	256.2	148.5	165.1
Mar.	276.5	172.8	128.6
Apr.	264.7	179.8	158.2
May	275.6	205.2	132.5
June	245.4	193.5	127.4
July	286.7	201.7	141.3
Aug.	219.5	217.6	154.7
Sept.	230.5	246.5	135.1
Oct.	299.8	227.6	152.3
Nov.	216.2	210.4	116.7
Dec.	235.7	245.5	182.2

American Gear Mfrs. Assn.

Charts copyright, 1957, STEEL.



	Sales Billed—Units 1956	1955	1954
Jan.	302,203	248,941	221,233
Feb.	286,386	261,183	199,035
Mar.	395,686	356,444	276,464
Apr.	352,873	241,870	220,849
May	326,008	255,941	200,434
June	248,326	239,728	195,781
July	259,774	206,758	193,607
Aug.	276,932	252,691	185,397
Sept.	320,278	306,507	238,235
Oct.	371,998	349,654	263,197
Nov.	300,381	307,267	237,882
Dec.	281,025	243,457	217,022
Totals	3,721,870	3,270,441	2,658,136

Vacuum Cleaner Mfrs.' Assn.

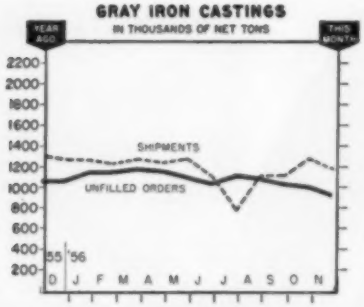
Best Available—Figures currently available cover only through November or December of last year. Not only is there a two or three month period to account for, but it should be noted that those months normally favor downtrends in many industries. The work month is shorter and other seasonal factors enter in. So when the government reported that manufacturers sold $28 billion worth of goods in December ($700 million below November's sales), it noted that the total was $1 billion above the December, 1955, level. The adjusted figure was equal to November's $28.7 billion.

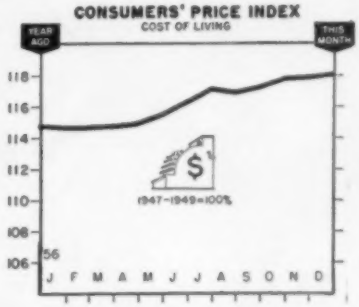
Projecting any trend on one or two month's figures can be dangerous. The November figure for the gear industry indicated a serious decline in that industry. But when the December figure became available, November stood out as an unusual dip in an otherwise good year (see chart above). The yearly average was well above both figures (254 per cent of the 1947-1949 average, reports American Gear Manufacturers Association). After recovering from the steel strike, the fabricated structural steel industry seemed to take a setback in November. But figures on December shipments from American Institute of Steel Construction shot back up to 297,785 tons, the third highest mark of the year and close to the industry's capacity. The vacuum cleaner industry set a variety of records every month for a period of over two years until November and December (see chart above). Despite a seasonal decline then, the industry anticipates a continuation of the upward trend in 1957.

The economy, especially the metalworking segment, is in a more delicately balanced position today than it has been for a long time. When business is clearly trending in one direction or the other, businessmen seldom hesitate in making their decisions. But today there is a great deal of "optimistic caution" because nobody can say for certain which way business will go in the near future.

Index Continues Strong

STEEL's industrial production index is strong evidence that there will be no break in the immediate picture. For the week ended Feb. 2, it registered a preliminary 165 (1947-1949=100), the same mark set in the last full week in Janu-





	Shipments 1956	Shipments 1955	Unfilled Orders* 1956	Unfilled Orders* 1955
Jan.	1,250	1,092	1,158	782
Feb.	1,215	1,106	1,141	852
Mar.	1,255	1,315	1,163	842
Apr.	1,218	1,294	1,145	966
May	1,236	1,310	1,086	938
June	1,152	1,296	1,041	982
July	763	1,070	1,109	1,050
Aug.	1,103	1,226	1,074	1,160
Sept.	1,110	1,253	1,037	1,151
Oct.	1,275	1,310	996	1,113
Nov.	1,176	1,306	917	1,062
Dec.	....	1,260	....	1,075
Total	....	14,838		

*For sale. U.S. Bureau of the Census.

	1956	1955	1954
Jan.	114.6	114.3	115.2
Feb.	114.6	114.3	115.0
Mar.	114.7	114.3	114.8
Apr.	114.9	114.2	114.6
May	115.4	114.2	115.0
June	116.2	114.4	115.1
July	117.0	114.7	115.2
Aug.	116.8	114.5	115.0
Sept.	117.1	114.9	114.7
Oct.	117.7	114.9	114.5
Nov.	117.8	115.0	114.6
Dec.	118.0	114.7	114.3

U.S. Bureau of Labor Statistics

ary. Last month bowed out with the highest average (162.2) of any in the history of the index.

Still showing the greatest strength is output of electric energy. It is holding between 12.3 billion and 12.5 billion kw-hr a week. This is about 8 per cent higher than comparable 1956 figures. As the days grow longer and temperatures milder, this figure will ease off, but increased industrial use will keep output relatively high. Auto and truck output is sticking close to the late January scheduling of about 167,000 units a week. January production of 642,090 cars was nearly 31,000 units better than the figure for the corresponding month last year, according to *Ward's Automotive Reports*. February is scheduled for 567,000 cars, about 12,500 more than in February, 1956.

Loadings of railroad freight revenue have not lived up to expectations so far this year. Through Jan. 26, the total is about 5.4 per cent under the year-ago period.

No Brakes on Electricity

Plans by the nation's electric power companies to spend about $40 billion on expansion in the next ten years will not be slowed by the increasing cost of money, declares Donald S. Kennedy, president of Edison Electric Institute and Oklahoma Gas & Electric Co. That cost is being more than offset by continuing operating economies, ranging from more efficient use of fuel to a steady drop in on-the-job accidents. Generating capacity will be more than 250 million kw in 1966, compared with 126.5 million kw in 1956.

Trends Fore and Aft

• The heat treating industry did 20.5 per cent more business in 1956 than it did in 1955, reports the Metal Treating Institute.

• Both consumers and businesses are paying off their debts these days. Consumer installment debt in December increased by only $528 million, compared with an increase of $751 million in December, 1955. All classifications of businesses reported net repayments to reporting members of the Federal Reserve System during the week ended Jan. 23. Industrial loans decreased $243 million for the period. Since June 27, 1956, commercial loans to the metalworking industry have decreased $120 million.

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Specifies EPCO
INVESTMENT CASTING
for Vital Part

Bulldog Symbol of Mack Trucks Sturdiness and Dependability

"EPCO Cast lever used by Mack Diesel trucks and buses on hydraulic governor control."

INVESTMENT CASTINGS IN ANY CASTABLE ALLOY EXCEPT MAGNESIUM

Mack engineers specified an EPCO Investment Casting on the above part that was previously machined from ½ inch flat stock.

EPCO Cast in SAE 1045 steel ready for use except for tapping of ¼-20 thread, the lever was made at less cost and well within Mack's high quality standards.

EPCO Cast levers have been in constant use since 1947, and have performed with the same rugged dependability expected in a Mack Bus or Truck.

Get an EPCO quotation before machining or assembling your intricate parts.

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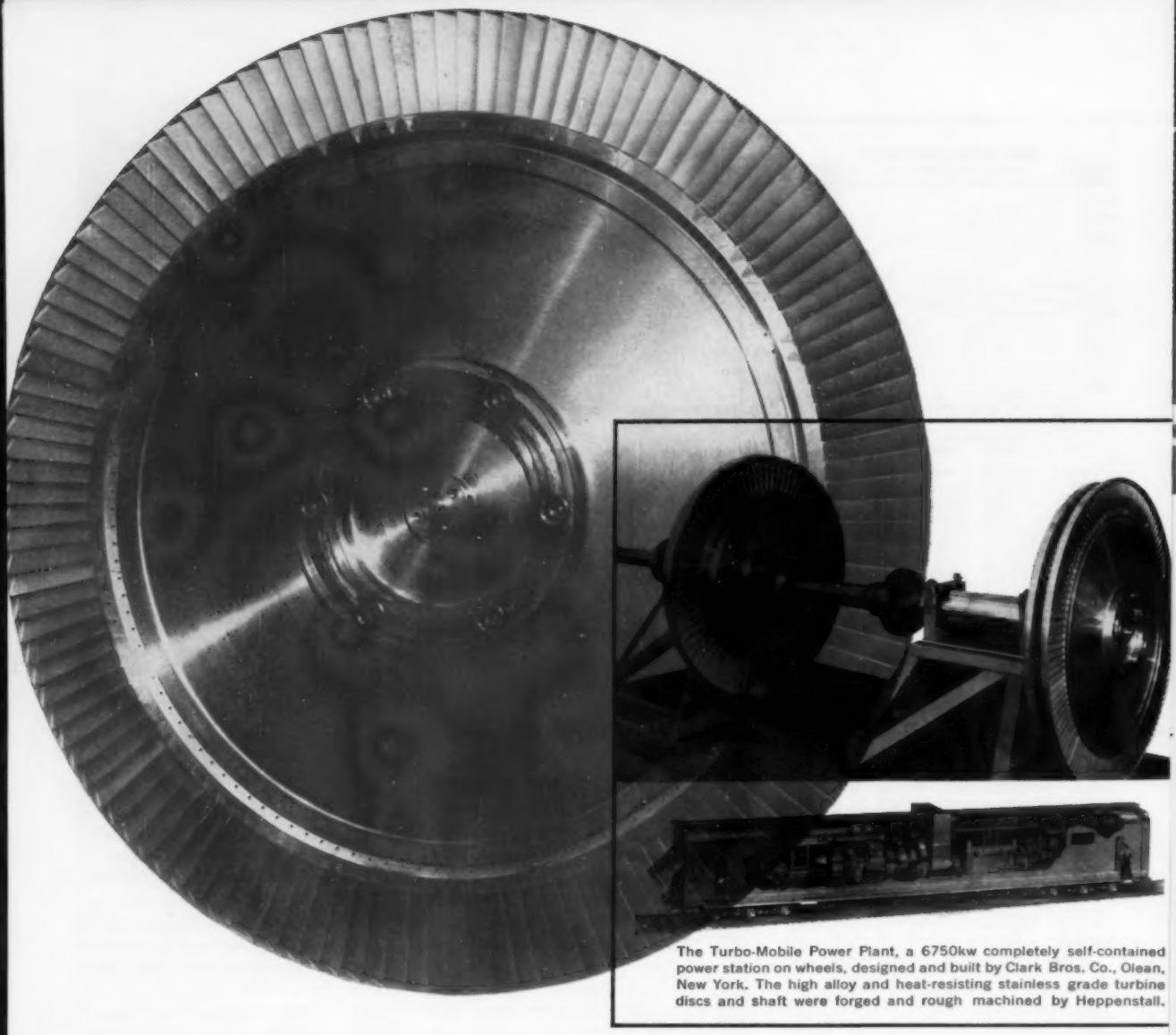

The Turbo-Mobile Power Plant, a 6750kw completely self-contained power station on wheels, designed and built by Clark Bros. Co., Olean, New York. The high alloy and heat-resisting stainless grade turbine discs and shaft were forged and rough machined by Heppenstall.

Heppenstall Forgings add reliability to Clark Power Plant Gas Turbine discs

Ingenious design and engineering have solved the problem of rapid restoration of power following natural disasters and war damage . . . or temporary power for fast growing residential or industrial areas. A Clark 6750kw gas turbine power plant can now roll in at normal rail speeds and put power on the line in the little time required to connect fuel and power outlet lines. It *must* be dependable, that's why the turbine discs used in driving the axial compressor and generator are Heppenstall Forgings.

Heppenstall Forgings, in any shape you may require, are made from special Heppenstall open hearth carbon and alloy steels, or high alloy and heat resisting stainless steels from Heppenstall Electric Induction Furnaces.

These Forgings must pass rigid inspection and ultrasonic testing . . . your assurance that each Heppenstall Forging becomes a trouble-free component of your product. And the satisfied user becomes a steady customer.

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. . . the most dependable name in forgings

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RAYMOND M. WAGGONER
Hubbard exec. v. p.

P. A. O'CONNELL
Bundy Tubing v. p.-sales

GEORGE E. HAWKINS
Air Reduction exec. v. p.

MERLE W. KREMER
Sylvania Electric post

Raymond M. Waggoner was elected executive vice president of **Hubbard & Co.**, Pittsburgh. He was vice president-general manager of Pacific Coast operations. **Howard Jackson**, vice president-production, assumes additional duties as general manager of the Chicago district manufacturing and sales. He moves to Chicago. **L. T. Owen** replaces Mr. Waggoner on the West Coast.

Donald C. Coleman fills the new post of director of operations and development for Wilputte Coke Oven Division, **Allied Chemical & Dye Corp.**, New York. He was superintendent of coke plant at U.S. Steel Corp.'s Fairless Works.

Regal C. Meier was elected vice president, **New Process Gear Corp.**, Syracuse, N. Y.

Frank G. Hickey Jr. was named a vice president of **Tait Mfg. Co.**, Dayton, O.

Hal O. Gummere was elected executive vice president-general manager, **Buckeye Tools Corp.**, Dayton, O. He was vice president-general manager. **E. B. Maynard** was elected vice president-sales.

Samuel M. Parks was made Pittsburgh district sales manager, **American Steel & Wire Division**, U.S. Steel Corp.

Carolina Steel & Iron Co., Greensboro, N.C., elected **L. H. Bennett** vice president-sales; **T. P. Noe Jr.**, vice president-production; **S. R. Webb**, vice president-engineering.

P. A. O'Connell was elected vice president-sales, **Bundy Tubing Co.**, Detroit. He was general sales manager, and is succeeded by **W. F. Kendall**. Mr. O'Connell succeeds **G. D. Baker**, now a director.

George E. Hawkins, vice president, **Air Reduction Co. Inc.**, New York, was elected executive vice president.

John Comstock was made sales manager, **Ready Tool Co.**, Bridgeport, Conn.

E. F. Coy was made sales director for **General Mills Inc.'s** mechanical division, Minneapolis. He was sales manager, Air Arm Division, Westinghouse Electric Corp.

Ralph Hayden Jr. was appointed manager of purchases and traffic by **Foxboro Co.**, Foxboro, Mass. He succeeds **Richard M. Kimball**, now consultant on procurement.

Bay E. Estes Jr. fills the new post of director-staff administration at **United States Steel Corp.**, Pittsburgh. He will supervise advertising, commercial research, product development and market development divisions. **Harold M. Ridlon** succeeds Mr. Estes as director, commercial research division.

J. Herbert Myers joined **Cincinnati Shaper Co.**, Cincinnati, as director of overseas operations.

Vincent D. Perry was elected a vice president of **Anaconda Co.**, New York.

Merle W. Kremer was made general manager, parts division, **Sylvania Electric Products Inc.**, at Warren, Pa. He was special assistant to Marion E. Pettegrew, vice president in charge of parts, radio and television, and tungsten and chemical divisions. **Richard E. Corcoran** fills the new post of product sales manager, wire and weld products, parts division.

Patterson-Emerson-Comstock Inc., Pittsburgh, elected **J. C. McCurley** senior vice president. He is succeeded as vice president-engineering by **A. W. Brullman**. **Kenneth W. Harris** and **William G. Cronk** were elected vice presidents.

Goslin-Birmingham Mfg. Co., Birmingham, appointed **C. R. Picker** assistant to the president and manager, process equipment sales. **H. E. Keene** was made manager of evaporator sales; **A. B. Adams**, manager of filter sales; **Jack Joyner**, manager of contract manufacturing sales.

Henry R. Merrill was named vice president-sales, **Behr-Manning Co.**, Albany, N. Y., division of Norton Co. **Bert M. Twamley** was made chairman, succeeding **Randall S. Manchester**.

R. C. Bennett Jr. was named general vice president, **National Electric Products Corp.**, Pittsburgh. Vice president-sales since 1950, he now is responsible for administration and co-ordination of company products and of staff operations. **L. D. Shank** becomes general sales manager. **A. L. Robinson Jr.**, sec-

G. A. GODWIN

EDWARD L. NUNG

P. R. Mallory vice presidents

CARL R. ROWE

TROY B. HUNT

Olin plant managers

retary, was made co-ordinator of operations.

G. A. Godwin and **Edward L. Nung** were elected vice presidents of **P. R. Mallory & Co. Inc.**, Indianapolis. **Mr. Godwin** is general manager of Mallory Metallurgical Divisions; he's also president of P. R. Mallory Plastics (Chicago) and chairman of Electronic Timers (Warsaw, N. Y.). Both are divisions. Mr. Nung is general manager, Mallory Electronic Divisions.

Russell V. Ringquist was made sales manager, carbide division, **Besly-Welles Corp.**, South Beloit, Ill. He was a sales engineer with Firth Loach Metals Inc.

Arthur W. Fox and **Paul Jennings** were elected vice presidents of **Camloc Fastener Corp.**, Paramus, N. J. Mr. Fox is director of sales; Mr. Jennings, manager of the west coast office.

Spencer Turbine Co., West Hartford, Conn., appointed **Robert W. Richardson** and **Norman S. Barnes** assistant sales managers; **David H. Hunt**, assistant chief engineer; **Karl A. Hedling**, chief draftsman.

Harry E. Pinkerton was named president of **Intercontinental Electronics Corp.**, Mineola, N. Y.

Walter B. Wurtman was named assistant to the president of **Sierra Drawn Steel Corp.**, Los Angeles.

Elmer Olson fills the new post of director of engineering and sales, **Rochester Products Division**, General Motors Corp., Rochester, N. Y. He is succeeded as chief engineer by **Adolph F. Braun**, staff engineer of experimental engineering for Buick Motor Division in Flint, Mich.

At Goodyear Tire & Rubber Co.'s industrial products division, Akron, **O. A. Schilling** was made sales manager; **R. R. Comstock**, assistant sales manager; **R. E. Chapman**, central region manager; **R. E. Mercer**, manager of hose sales.

General Steel Castings Corp., Granite City, Ill., appointed **Winthrop B. Reed** manager of eastern sales with offices at Eddystone, Pa. He is succeeded as manager of industrial sales by **Frank W. Tolan.**

Duncan J. Brown was made supervisor of milling machine sales for **Brown & Sharpe Mfg. Co.**, Providence, R. I.

Richard H. Heberling was elected vice president-operations for **Trailmobile Inc.**, Cincinnati. He was works manager, Buda Division, Allis-Chalmers Mfg. Co.

Carl R. Rowe was named plant manager of **Olin Mathieson Chemical Corp.'s** rolling mill at Omal, O. He was production engineer at Kaiser Aluminum & Chemical Corp. **Troy B. Hunt** was named plant manager of **Olin Revere Metals Corp.'s** reduction plant at Omal. He was with Olin Mathieson in charge of design of the reduction plant. With formation of Olin Revere, (jointly operated by Olin Mathieson and Revere Copper & Brass Inc.) he was placed in charge of the reduction plant.

Everett C. Schmachtenberg was placed in charge of a newly formed industrial centrifugal compressor sales department at Harrison Division, **Worthington Corp.**, Harrison, N. J.

Harold F. Hanssen was appointed plant manager, Electric Alloy Steel Division, **Howard Foundry Co.**, at Los Angeles. He served in a similar position in Howard's Milwaukee investment casting foundry, and prior to that headed its Chi-

DUNCAN J. BROWN

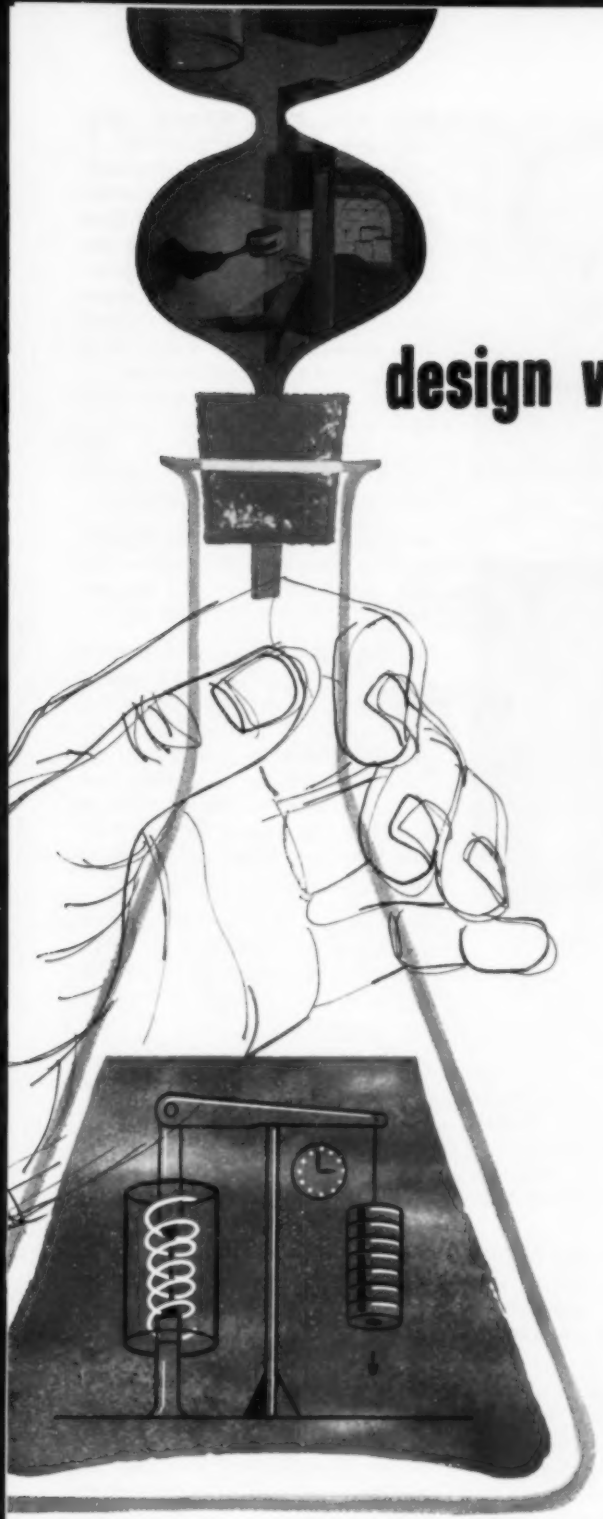
Brown & Sharpe post

RICHARD H. HEBERLING

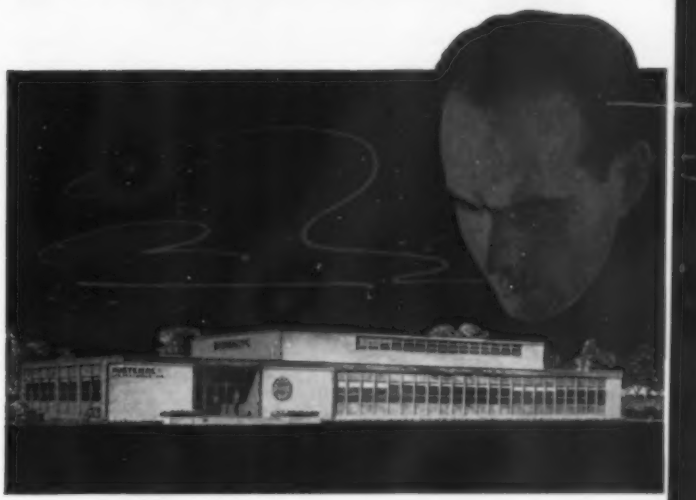
Trailmobile v. p.

HAROLD F. HANSSEN

Howard Foundry plant mgr.



design with austenal in mind



New **microcast** *Research Facilities will increase investment casting applications and give design engineers greater latitude in planning parts.*

A new facility for advanced research is now under construction at Austenal to broaden the many applications of Microcast—to make new methods and alloys available, and to allow greater freedom and latitude in part designing.

One section of this new plant will contain the equipment familiar to the investment casting industry and in addition, equipment necessary for investigating numerous other methods of making and treating castings. Adjoining the foundry area will be shops for pilot line and experimental work in mold making, waxing, investing and finishing. There will be an area containing laboratories for mechanical testing, physical testing, metallographic investigations, refractories development and chemical investigations.

Contact your Austenal engineer today and ask him to show you how Austenal's continuing program of research and development will help you design greater performance and reliability into the investment castings you require.

---It's **NEW** *from Austenal*

"Design with Microcast in Mind," Austenal's new informative booklet, tells you how to get the greatest benefit from Microcast, showing the great latitude of design possibilities, alloys available and a great deal more, valuable information. Write for it today.

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REAR ADM. C. R. KHOURY
heads Pittsburgh Steamship

WAYNE M. PIERCE JR.
Norden-Ketay v. p.

RAYMOND F. SHIMA
Victoreen Instrument post

R. E. BROWN
heads Huppower Division

B. M. BYERS
A. M. Byers president

WILLIAM T. YLVISAKER
Pheoll Mfg. v. p.

cago pattern and die manufacturing plant.

R. E. Brown was elected president of Huppower Division, **Hupp Corp.**, Detroit. He was general manager.

J. Frank Frain was appointed principal engineer for **Kaiser Engineers**, division of Henry J. Kaiser Co., Oakland, Calif.

Donald Parks, engineering supervisor, was appointed chief engineer of **Micrometrical Mfg. Co.**, Ann Arbor, Mich.

Scovill Mfg. Co. appointed four general managers for its Waterbury, Conn., divisions, following retirement of **Arthur P. Hickcox**, vice president and general manager of the divisions. They are **Chauncey P. Goss**, mills division; **Henry W. Wild**, general manufacturing division; **Willis H. Machin**, forging and screw machine division; **Paul E. Fenton**, closure division.

Howard A. Bach was made sales manager, Lagonda Division, **Elliott Co.**, at Springfield, O.

B. M. Byers, vice president-sales, was elected president of **A. M. Byers Co.**, Pittsburgh. He succeeds his brother, **J. Frederic Byers Jr.**, now chairman. **Ramon I. Lindberg** was made director of corrosion research, a new post. He was with Sinclair Research Laboratories Inc.

William T. Ylvisaker was elected vice president and general manager, commercial division, **Pheoll Mfg. Co.**, Chicago. He was general manager.

R-P&C Valve Division, American Chain & Cable Co. Inc., Reading, Pa., appointed **John W. Swanagon** Philadelphia district manager. He is replaced as Atlanta district manager by **George Legan. Robert Freedley** succeeds **W. G. Whippo**, resigned, as Pittsburgh district manager.

James W. Herron was named general sales manager, **H. H. Robertson Co.**, Pittsburgh. **Robert Finlayson** was made product manager for Q-Floor; **Donald Havlish**, product manager for ventilators.

Rear Adm. C. R. Khoury, USN, ret., was appointed president of **Pittsburgh Steamship Division**, U.S. Steel Corp., Pittsburgh, effective Mar. 1. He will succeed **Donald C. Potts**, who will join the staff of the executive vice president-engineering and raw materials. Admiral Khoury joined U.S. Steel in 1953. He was made assistant to vice president-raw materials Jan. 1. **A. S. Thaeler** was appointed vice president-engineering, Pittsburgh Steamship Division, effective Feb. 1. He replaced **R. C. Stanbrook**, retired.

Wayne M. Pierce Jr. was appointed vice president for engineering and manufacturing at **Norden-Ketay Corp.**, Stamford, Conn.

Raymond F. Shima was elected executive vice president and general manager, **Victoreen Instrument Co.**, Cleveland. He becomes chief executive officer in addition to his former duties as treasurer, succeeding **Cyrus W. Haller**, who recently resigned as president. **Richard T. Brown**, secretary, was elected vice president.

Vincent J. Calise was made general sales manager, **Graver Water Conditioning Co.**, New York, division of Graver Tank & Mfg. Co. Inc.

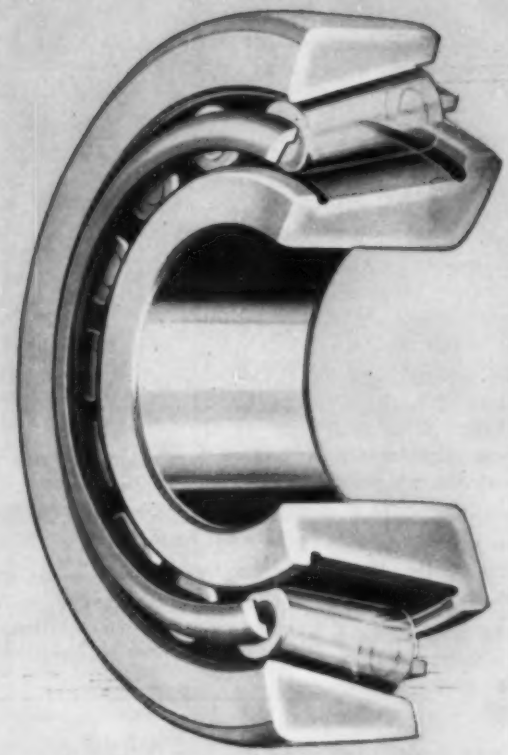
Harry F. Ross, former metallurgist of Central Alloys Division, Republic Steel Corp., was made manager of **Ipsenlab Inc.**, Rockford, Ill.

Bell Aircraft Corp., Buffalo, appointed to its new guided missiles division: **Tex S. Lines**, assistant manager; **John C. Parkin**, director of engineering; **Robert E. Sonnekson**, director of manufacturing; **John H. Steele**, director of marketing.

Siegler Corp., Centralia, Ill., appointed **Paul S. Hammond** vice president-treasurer of its General Water Heater Corp. Division. He continues as vice president, Holly Mfg. Co. Division. **Ted Candee** was made vice president-manufacturing for both divisions. **Robert Grossman** was made vice president-general sales manager, Holly Mfg. Co.

Femco Inc., Irwin, Pa., appointed district sales managers: **J. W. Bauer Jr.**, western Pennsylvania; **John Taylor**, Cleveland, Youngstown, Buffalo; **Addison Davidson**

There's a BOWER TAPERED ROLLER BEARING engineered to fit your product



Types and sizes to fit a wide range of tapered bearing applications

There's no need to compromise with bearings! Whatever your product, if it uses tapered roller bearings, call in a Bower engineer for expert help on selecting the exact type and size you need.

Depending on your own particular needs, he'll make sure you get the exact size and type—selected from Bower's complete tapered line—engineered to assure maximum performance in your application.

Most important of all, when you specify Bower tapered roller bearings for your product, you get all the advantages of advanced Spher-O-Honed design—less maintenance, longer life, smoother operation. Get the full facts on the *complete* Bower line.

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ROBERT W. STOKES
Radio Frequency v. p.

JOHN H. MORAVA
heads U. S. Steel Supply

WILLIAM HAGEL
United Eng. v. p.-operations

Jr., eastern region; **Warren C. Sprague**, West Coast; **James Beaven**, southern region.

Radio Frequency Co. Inc., Medfield, Mass., appointed **Robert W. Stokes** vice president. He currently represents the firm in sales throughout the Midwest with headquarters in Cleveland.

John H. Morava was elected president, **United States Steel Supply Division**, Chicago, U.S. Steel Corp. He succeeds **Leslie B. Worthington**, recently made president of Columbia-Geneva Steel Division in San Francisco. Mr. Morava was Chicago district sales manager for U.S. Steel.

Clark Controller Co., Cleveland, named **W. R. Heckman** and **J. H. Heuslein** to new posts as assistants to **R. L. Puette** vice president-operations division. Mr. Heckman, former manager of industry sales, was named assistant operations manager and will head the manufacturing section of the operations division. Mr. Heuslein, former production manager, will be production planning manager in charge of scheduling, production methods and similar operations. Also named to new posts are **E. M. Schrafrik**, production manager-engineered products; **C. W. Graber**, production manager - merchandise products; **K. G. Gilbert**, planning engineer.

Leslie Meikleham was made chief purchasing agent, **Unitary Equipment Division**, Carrier Corp., Syracuse, N. Y.

Ernest Payne was named vice president-research and marketing, **Central Screw Co.**, Chicago.

William Hagel, former vice president and executive assistant, **United Engineering & Foundry Co.**, Pittsburgh, was appointed vice president-operations. In charge of manufacturing and production, he will continue to supervise the company's estimating and sales contract departments.

Northwestern Steel & Wire Co., Sterling, Ill., appointed **Edward A. Thomson** superintendent of its new 16-in. mill. He was superintendent, bar strip mill, at Algoma Steel Co. Ltd.

John M. Patterson was made assistant sales manager, **Beryllium Corp.**, Reading, Pa.

Delbert A. Burman was made a buyer in the purchasing department of **Crucible Steel Co. of America**, Pittsburgh.

Ralph G. Greer was made sales manager, construction equipment division, **International Harvester Co.**, Chicago. He succeeds the late **I. P. Payne.**

Alphe G. Jarreau was elected vice president, **Barden Corp.**, Danbury, Conn. Former sales manager, he continues to head sales activities.

C. T. Osborne succeeds **John W. Hall**, retired, as manager of the Fresno, Calif., plant of **Consolidated Western Steel Division**, U.S. Steel Corp.

Roots - Connersville Blower Division, Dresser Industries Inc., Connersville, Ind., appointed **Glenn H. Crocker** manager, factory sales; **Joseph L. Hylton**, manager-market research.

Norbert C. Hodgson was placed in charge of sales of Johnston corrugated cinder pots by **Mackintosh-Hemphill Division**, E. W. Bliss Co., Pittsburgh.

Flori Pipe Co., St. Louis, subsidiary of Sparton Corp., appointed **Roy W. Reierson** vice president of its new Flori-Houston pipe fabrication combine and general manager of the Houston plant. **Dwight Ketring** was made plant manager of the St. Louis works; **J. F. Huitt**, chief engineer. **William E. Keim** was made New York district sales manager; **Paul D. Broussard**, Houston district sales manager.

At Ford Motor Co.'s aircraft engine division, Chicago, **R. A. Powley** was made division assistant general manager; **John A. McCabe**, general manufacturing manager. Mr. Powley replaces **John B. Lawson**, recently made general manager of the company's automatic transmission division.

Ralph Nitz was made assistant sales manager, tank division, **Heil Co.**, Milwaukee.

John J. McGarigal Jr. was named plant engineer (plant No. 2, Toledo, O.), **Doehler-Jarvis Division**, National Lead Co.

Dan S. Tilden was made director of sales and service; **W. S. Allison**, sales manager of the Utica, N. Y., division of **Bendix Aviation Corp.**

OBITUARIES...

William E. C. Clifford, 74, chairman, **Clifford-Jacobs Forging Co.**, Champaign, Ill., died Jan. 23.

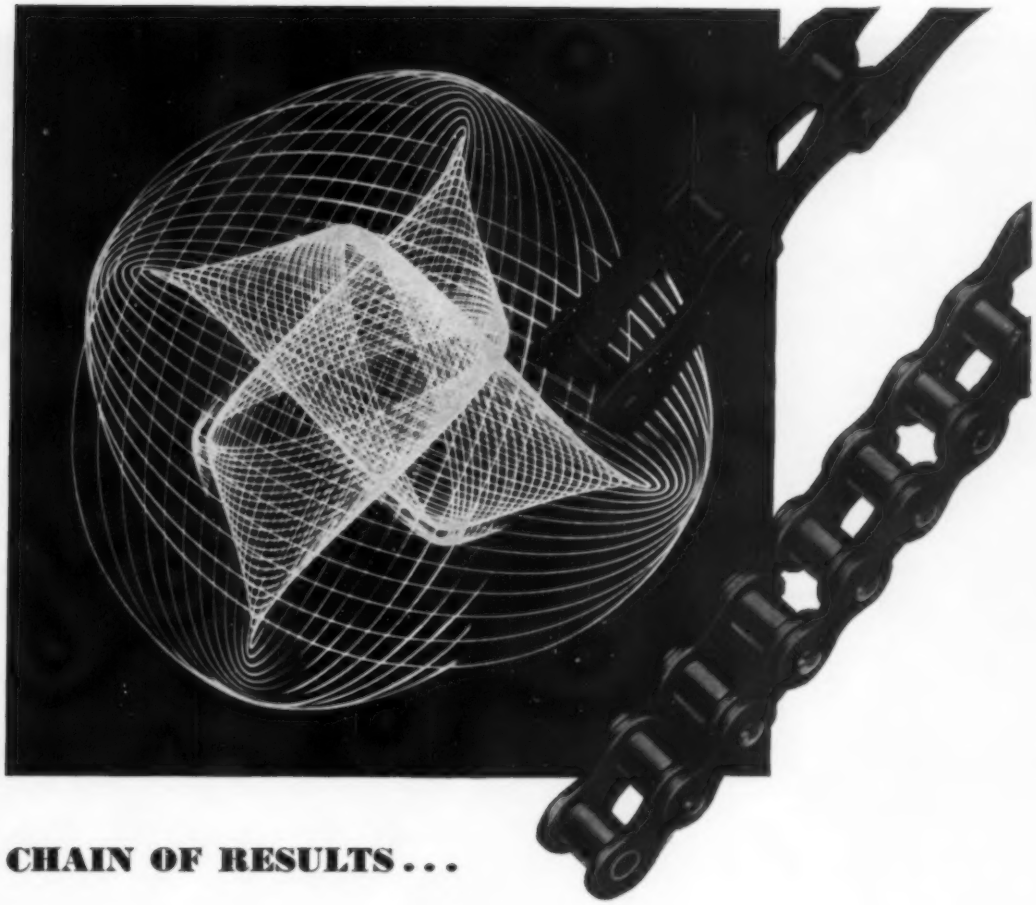
Carl A. Houck, 73, former vice president, **Buffalo Structural Steel Corp.**, Buffalo, died Jan. 22.

Ray L. Howard, 61, a sales engineer for **Dana Corp.**, Toledo, O., died Jan. 29.

Albert C. Lindquist, superintendent, **Weldon Tool Co.**, Cleveland, died Jan. 29.

Y. D. Hardlicka, 72, secretary, **Cleveland Cap & Screw Co.**, Cleveland, died Jan. 30.

A. George Koenig, 60, general manager of the Philadelphia office of **Weston Electrical Instrument Corp.**, Newark, N. J., died Jan. 26.



CHAIN OF RESULTS . . .

Whitney's Self-Lubricating Single and Double Pitch Roller Chain and "F-R" (fatigue resistant) Processed Roller Chain are design advancements that get results for machine manufacturers and users in many industries.

They should. For example, Self-Lube Roller Chain outlasts regular chain as much as 5 to 1 under rugged field conditions subject to extremes of dust or mud. In addition, they are widely used on processing equipment where cleanliness is vital and where external lubrication is not practical or desirable. Here, Whitney's exclusive sintered steel chain bushings "oil from the inside" . . . are prelubricated for life.

Whitney's exclusive "F-R" (fatigue resistant) Processed Roller Chain is establishing new service standards for durability, particularly on problem drives involving unusual operational conditions, stresses and heavy shock loads. This performance comes from the exclusive Whitney "F-R" process which offsets excessive operational stresses in the chain.

These new dynamic, balanced designs serve better, longer and at less over-all cost. And so does the entire Whitney line of A.S.A. Roller, Silent and Conveyor Chain Drives . . . all precision engineered for top quality.

Whitney Field Engineers provide nation-wide consultant service, backed up by company operated warehouses and alert Whitney Distributors offering a complete off-the-shelf stock service. If you want RESULTS specify WHITNEY CHAIN.

Whitney

CHAIN COMPANY

249 HAMILTON ST., HARTFORD 2, CONN.

ROLLER CHAIN • SILENT CHAIN • CONVEYOR CHAIN • SPROCKETS • FLEXIBLE COUPLINGS

QUICK DELIVERY

Special fasteners to your requirements

Ferry Cap fills rush requests for custom-made threaded fasteners. That's been our business for 50 years.

To render even better service we will, if desired, "sit in" and help plan fasteners at the time products are designed.

Even if you don't anticipate a fastener problem, we'll be happy to look over your preliminary drawings—frequently we can suggest fasteners that will cut costs and assembly time. You can count on Ferry Cap, so call on Ferry Cap *TODAY!*

THE FERRY CAP & SET SCREW COMPANY

Makers of the famous Countr-Bor® Screw for socket head applications.

2159 SCRANTON ROAD · CLEVELAND 13, OHIO

FERRY CAP *is geared to FASTER SERVICE*

Le Tourneau Back

Earth-moving equipment leader will manufacture again in 1958. Machines will be new

ROBERT G. Le Tourneau will re-enter the earth-moving equipment industry in 1958 after an absence of five years. In Chicago for the American Road Builders Association show, the head of the multi-million dollar R. G. Le Tourneau Inc. said his new machines will be powered by revolutionary "electric wheels."

In 1953, Mr. Le Tourneau sold his business to Westinghouse Air Brake Co. for $31 million, and Le Tourneau-Westinghouse Co. was formed to manufacture and market his old line of earth-moving equipment. Included in the sale was an agreement that he would not make or sell such equipment for five years (until May 1, 1958).

The 68-year-old industrialist-philanthropist moved his firm to a 12,000-acre plant site near Longview, Tex., and with 900 employees has been developing gigantic machines for land clearing, logging, offshore drilling and offroad transportation.

War Effort—Le Tourneau produced 70 per cent of the basic earth-moving equipment used by the Armed Forces during World War II.

The "electric wheel" is described as "a relatively simple arrangement of high torque electric motors geared directly to the inside of each wheel and to all other points where power is needed." A high horsepower diesel engine is mounted on the machine to drive alternating current and direct current motors.

Le Tourneau's new lines will use the trademark "Ar-Gee." Mr. Le Tourneau said he will "guard as much as possible against confusion of R. G. Le Tourneau Inc. and Le Tourneau-Westinghouse Co." The new trademark comes from his initials.

Sharpsville Industries Inc.

Sharpsville Industries Inc. opened its general offices in Youngstown. The company has a plant at Sharpsville, Pa., with facilities for slitting, shearing and edging flat-rolled products. John Clarke is president; H. R. Johnson, general manager; and E. J. Hewitt, assistant general manager.

Jones & Lamson Opens Branch

Jones & Lamson Machine Co., Springfield, Vt., opened a Boston district office at 751 Main St., Waltham 54, Mass. John H. Hinchliffe is district manager. The firm makes an extensive line of machine tools. Products of the Thread Tool Division will not be handled by the new office.

Ferro Enlarges Branch Office

Ferro Corp., Cleveland, has opened an enlarged sales and service office at 336 N. Central Ave., Chicago, under the direction of G. W. Hofstetter, western regional manager, Frit & Glaze Division.

Buys Heat Treating Furnace

Youngstown Sheet & Tube Co., Youngstown, awarded a contract to the Gas Machinery Co.'s Industrial Furnace Division, Cleveland, to install a car-type plug heat treating furnace in its new seamless mill at Indiana Harbor, Ind.

Simpson Electric Decentralizes

Simpson Electric Co., Chicago, continues to decentralize its manufacturing facilities. Its newest plant (Mercer, Wis.) is nearing completion. It will be devoted primarily to meeting increased demands on the company's warehouse stock of panel instruments. Harold Redding is plant manager.

Rite-O-Tool Completes Project

Rite-O-Tool & Gage Co., Hazel Park, Mich., completed an expansion program which increases its plant and office space by 50 per cent.

Niagara Cutter Expanding

Niagara Cutter Division of Bollier-Damerell Inc., North Tonawanda, N. Y., is adding 6000 sq ft to its facilities by taking over a building at 330 Niagara St., that city. Additional manufacturing

COWLES

TRIMMING KNIVES

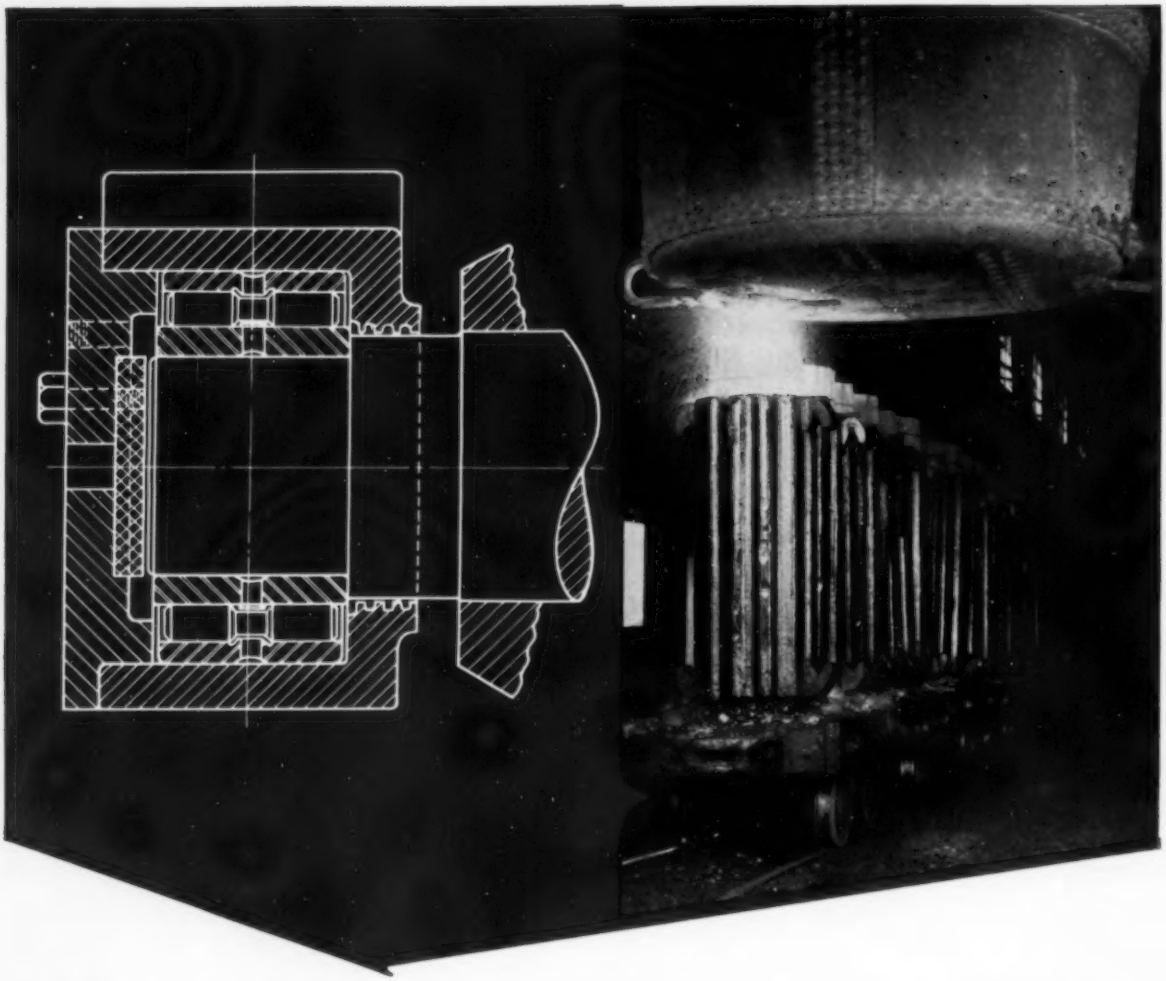
produce more tonnage per grind

Cowles knives stay on the job longer. They keep mills in continuous production without downtime for knife changes. Manufactured from individually hammered forgings, and heat treated to assure maximum durability, they meet industry's most exacting requirements. Complete range of sizes. **Prompt delivery.** Widely used by all principal producers and processors. Let us quote on your requirements!

COWLES
TOOL COMPANY
2086 WEST 110th STREET
CLEVELAND 2, OHIO

Specializing in the Manufacture of

ROTARY SLITTING KNIVES • SPACING COLLARS • GANG TOOLS • EDGING ROLLS • CUT-OFF KNIVES • SEAM GUIDE ROLL FINS • SEAM GUIDES • WIRE DRAWING TOOLS • STANDARD AND SPECIALLY ENGINEERED TOOLS FOR ALL FERROUS AND NON-FERROUS PROCESSING, TRIMMING AND FORMING REQUIREMENTS.



Bearings, Inc. engineering service . . . keeps ingot mold cars on the move

Ingot mold cars for a large tube mill were continually out of service due to the short life of babbitt, bronze or other bearings originally supplied in the cars.

The Trouble? Bearings, Inc. engineers found shock loads far beyond the capacities of the original bearings. Extreme wear on bearings due to excessive skewing, bent axles and uneven track.

The Answer. Shown above is the Bearings, Inc. drawing of the installation that replaced the original bearings. It has greatly increased load capacity and no dimensional change is required in the shaft or bearing housing.

The Result. The new bearing is designed on a new principle that keeps rollers in line and eliminates skewing. Shock loads due to uneven tracks have little effect on our installation for its construction makes possible a greater number of rollers available to support the load at all times.

This is just one of the many such problems we have solved for our customers. In all cases we supply only bearings we are authorized to distribute. They are new and come to you fresh in the manufacturers' boxes.

If you have a bearing problem or need replacement bearings in a hurry — call or write our branch nearest you, they're ready to give fast service.

Rendering bearing service in the territories adjacent to our branches, listed below.

BEARINGS, INC.

OHIO: Akron • Canton • Cincinnati • Cleveland • Columbus • Dayton • Elyria • Hamilton • Lima • Mansfield • Toledo • Youngstown • Zanesville
INDIANA: Ft. Wayne • Indianapolis • Muncie • Terre Haute
PENNSYLVANIA: Erie • Johnstown • Philadelphia • Pittsburgh • York
WEST VIRGINIA: Charleston • Huntington • Wheeling
NEW JERSEY: Camden • **MARYLAND:** Baltimore
DELAWARE: Wilmington •
Subsidiaries: Balanrol Corp. • Buffalo, N.Y.•
Kentucky Ball and Roller Bearing Co. • Louisville, Ky.

equipment is being acquired for production of the firm's specialized cutting and boring tools.

Eutectic Welding Opens Unit

Eutectic Welding Alloys Corp., Flushing, N. Y., opened a warehouse-service center at 1402-1414 S. Seventh St., Phoenix, Ariz. It will be supervised by John Maffeo. A stock of low temperature welding alloys will be maintained.

Die Set Firm Buys Equipment

Standard Die Set Manufacturers Inc., Cranston, R. I., has just invested more than $100,000 in new capital equipment. The largest outlay was for an automatically controlled heat treating unit. Other items included a high frequency induction hardening unit. The firm also added 3000 sq ft of floor space.

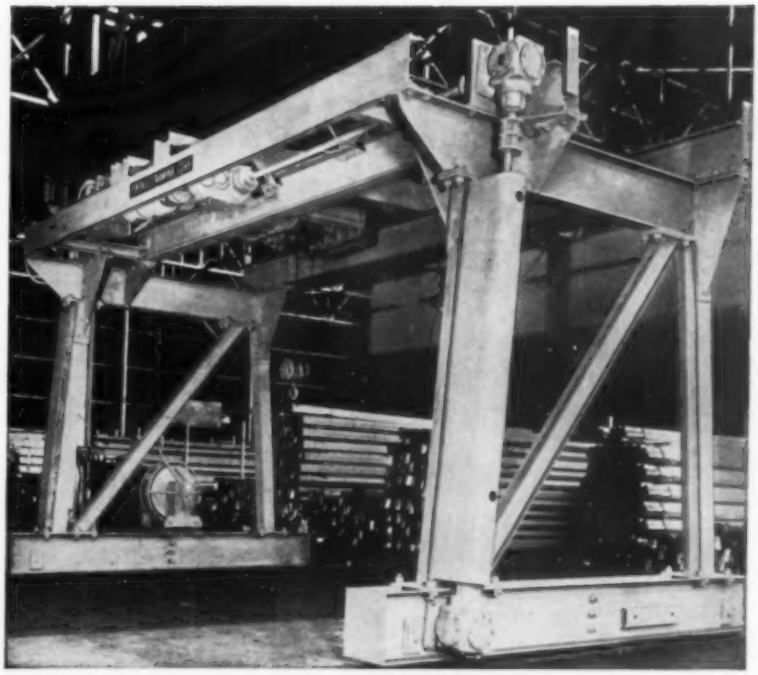
Leland Electric Leases Space

American Machine & Foundry Co.'s Leland Electric Co. Division has leased the 140,000 sq-ft plant formerly owned by Standard-Thompson Co. in Dayton, O. Production facilities for Leland's aircraft products will be consolidated in the new facility. E. C. Ebeling, vice president and general manager of Leland, will direct operations of the new plant.

Parker Buys West Coast Firms

Parker Appliance Co., Cleveland, has purchased Franklin C. Wolfe Co. Inc., Culver City, Calif., and Mathewson Corp., Los Angeles.

Wolfe has developed several types of patented sealing devices for leakless sealing in aircraft, electronics and other applications. Mathewson makes precision metal parts, some of which are components for the sealing devices. Wolfe and Mathewson together employ over 200 and do an annual business exceeding $3 million. The two will be operated as Franklin C. Wolfe Co., division of Parker. Col. Franklin C. Wolfe, who has been president and treasurer of his firm since its establishment in 1945, will continue as president of the new division.



CHICAGO TRAMRAIL

GANTRY CRANES

At the modern plant of one of the country's largest aluminum companies, Chicago Tramrail Gantry Cranes handle long extruded pieces from a 14,000-ton extrusion press . . . transfer these pieces to other operations throughout the mill.

Fourteen Chicago Tramrail Full Gantry Cranes provide individual handling equipment for individual operations to eliminate waste time waiting for busy overhead cranes. Designed for heavy-duty, continuous service, these Gantries are built with maximum headroom and maximum clearance between legs to operate independently under the large overhead cranes.

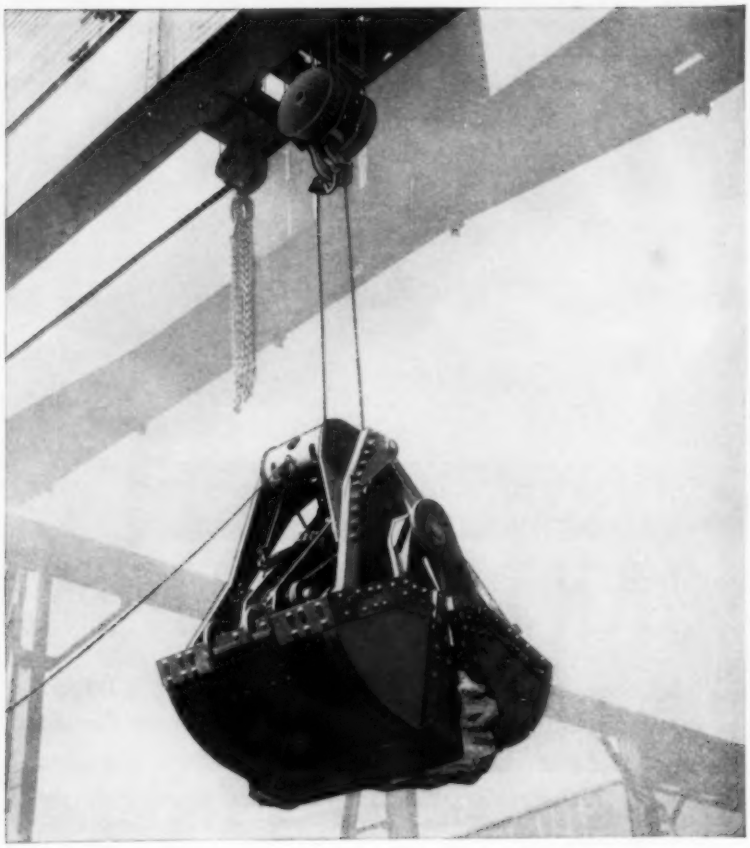
For a practical, economical solution to your materials handling problems, see our experienced engineers. Special designs, sound engineering and broad application knowledge qualify us for helpful service.

CHICAGO TRAMRAIL CORPORATION

1326 SO. KOSTNER AVENUE • CHICAGO 32, ILLINOIS

OVERHEAD CRANES • JIB CRANES • STACKER CRANES • MONORAIL SYSTEMS

MORE WORK . . . FASTER!
WITH ERIE STRAYER HOOK-ON CLAMSHELLS



CHECK these exclusive features:

- √ EASY HOOK-ON—no changeover problem. Versatile.
- √ COMPACT, RUGGED DESIGN—longer, tougher service.
- √ LIMITED HEADROOM REQUIREMENT—made for tight spots.
- √ ALWAYS UNDER PERFECT CONTROL—eliminates shock.
- √ ¼ TO 10 YARD CAPACITY—models to suit your needs.

THE FAMOUS **STRAYER ELECTRIC** BUCKET
ALSO AVAILABLE FOR AC OR DC OPERATION

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ERIE STRAYER CO.
GEIST ROAD • ERIE, PENNSYLVANIA

Spend $17 Million

Bell Aircraft, Timken and Ryan Aeronautical announce plans to expand facilities

EXPANSIONS and improvements costing $17 million have been announced by two aircraft firms and a roller bearing company.

Bell Aircraft Corp. will spend $15 million to improve research and development facilities at Buffalo. Timken Roller Bearing Co. plans a $1.5 million modern steel building at Canton, O. Ryan Aeronautical Co. will spend $500,000 to house its engineering and laboratory departments at San Diego, Calif.

Steel Firms Build—U.S. Steel Corp. announced that a new metallurgical laboratory, to be one of the largest at any steel plant, will be erected at its Duquesne, Pa., Works.

Sharon Steel Corp.'s Brainard Division announced a new product research development laboratory for the entire strapping industry will be opened this month at Warren, O.

Atlas Plans More Research

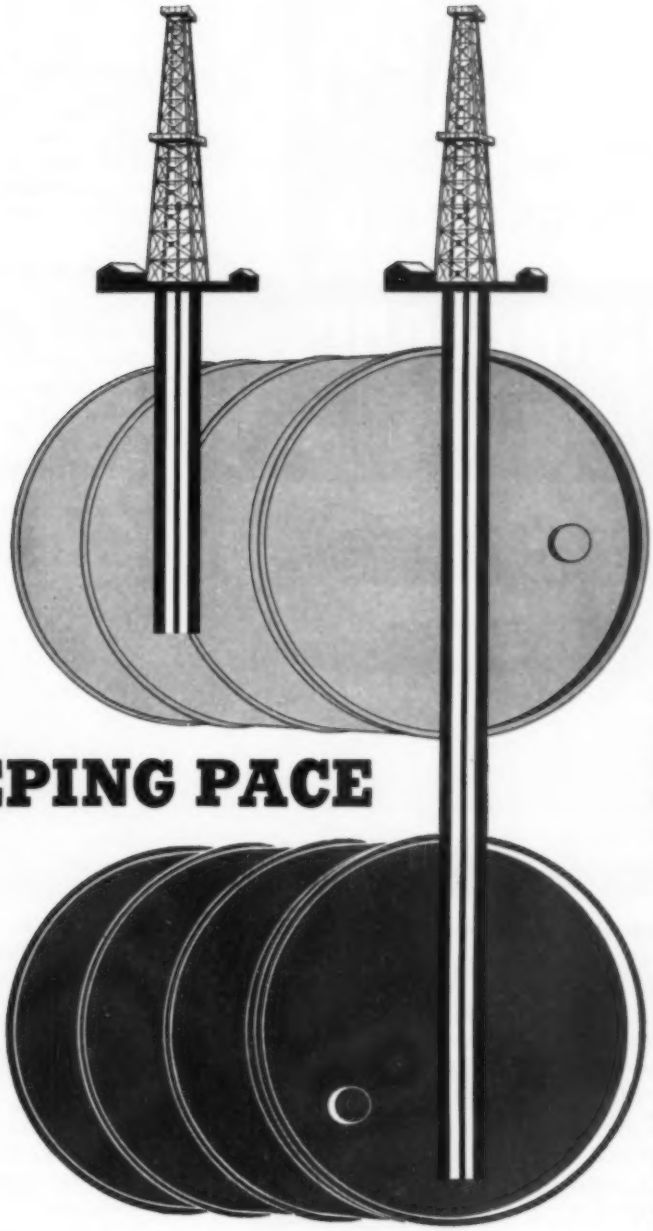
Atlas Powder Co., Wilmington, Del., is constructing a $3-million technical center which is scheduled for completion by the end of this year. The firm plans to just about double its research and development activities within the next few years.

Plomb Tool Renamed

Plomb Tool Co., Los Angeles, changed its name to Pendleton Tool Industries Inc. The two plants of the parent company (in Los Angeles and Jamestown, N. Y.) will operate as divisions under the name of Proto Tool Co.

Kelvin Electric Organized

Kelvin Electric Co., a recently organized electronic manufacturing firm, has begun operations at 5907 Noble Ave., Van Nuys, Calif. The company makes precision wound resistors for use in electronic equipment and resistive networks for



KEEPING PACE

Drills were chewing their way down for about 2000 feet in the search for oil in 1916. Today's drilling depth is more than double that.

The change in drilling that forty years has brought well symbolizes many advances in the petroleum and chemical industries. Engineers have dug more deeply into the secrets of nature, too . . . have designed plants and processes to wrest new products and services from petroleum, ores and elements.

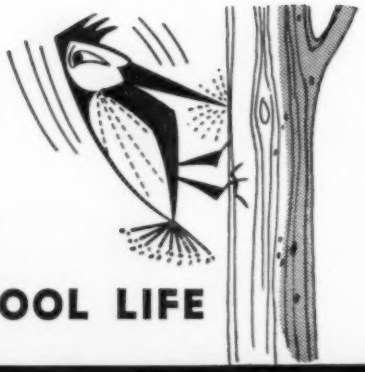
We mentioned 1916 because that is the year Sun Ship was founded. It has long served the swift-growing needs of petroleum and chemical industries. Year by year, the engineering skill and facilities of the great Sun Ship plant have proven their ability to meet the demands for plant and equipment keyed to the swift pace of progress in these and other important fields. Sun Ship keeps pace with progress.

Sun

SHIPBUILDING & DRY DOCK COMPANY

SINCE 1916

ON THE DELAWARE • CHESTER, PA.



reduce
vibration
INCREASE TOOL LIFE

WITH WENDT-SONIS
***NO-CHAT SHANKS**

FOR BORING BARS

GRINDING QUILLS

CUT-OFF TOOL

When tool vibration is reduced, finish is improved, deeper cuts can be made, and taper is eliminated in deep hole boring.

When tool life is increased, costs go down, profits go up.

So you save in many ways with "No-Chat" tool shanks specially engineered to reduce vibration, increase tool life. This very dense, rigid material is available rough or finished in round, square or rectangular stock. The W.S. line of standard "No-Chat" tools includes boring bars and cut-off tools.

For detailed specifications — for technical assistance in using "No-Chat" — see your Wendt-Sonis distributor's salesman.

Send for specification sheets today Dept. SM N-256

*"No-Chat" is a registered trade name of the P. R. Mallory Co.

WENDT-SONIS COMPANY
Hannibal, Missouri • Rogers, Arkansas

use as attenuators and precision voltage dividers. Principals in the firm are W. I. Elliott and K. T. Eckardt.

Forms West Coast Division

Magnetic Amplifiers Inc., New York, opened a West Coast Division at El Segundo, Calif., for engineering and production of magnetic and transistor servosystems.

Beckman Leases New Plant

Beckman Instruments Inc. leased a new 20,000 sq-ft plant in Anaheim, Calif., at 325 N. Muller Ave. for its data and control systems group.

Cleveland Brass Buys Plant

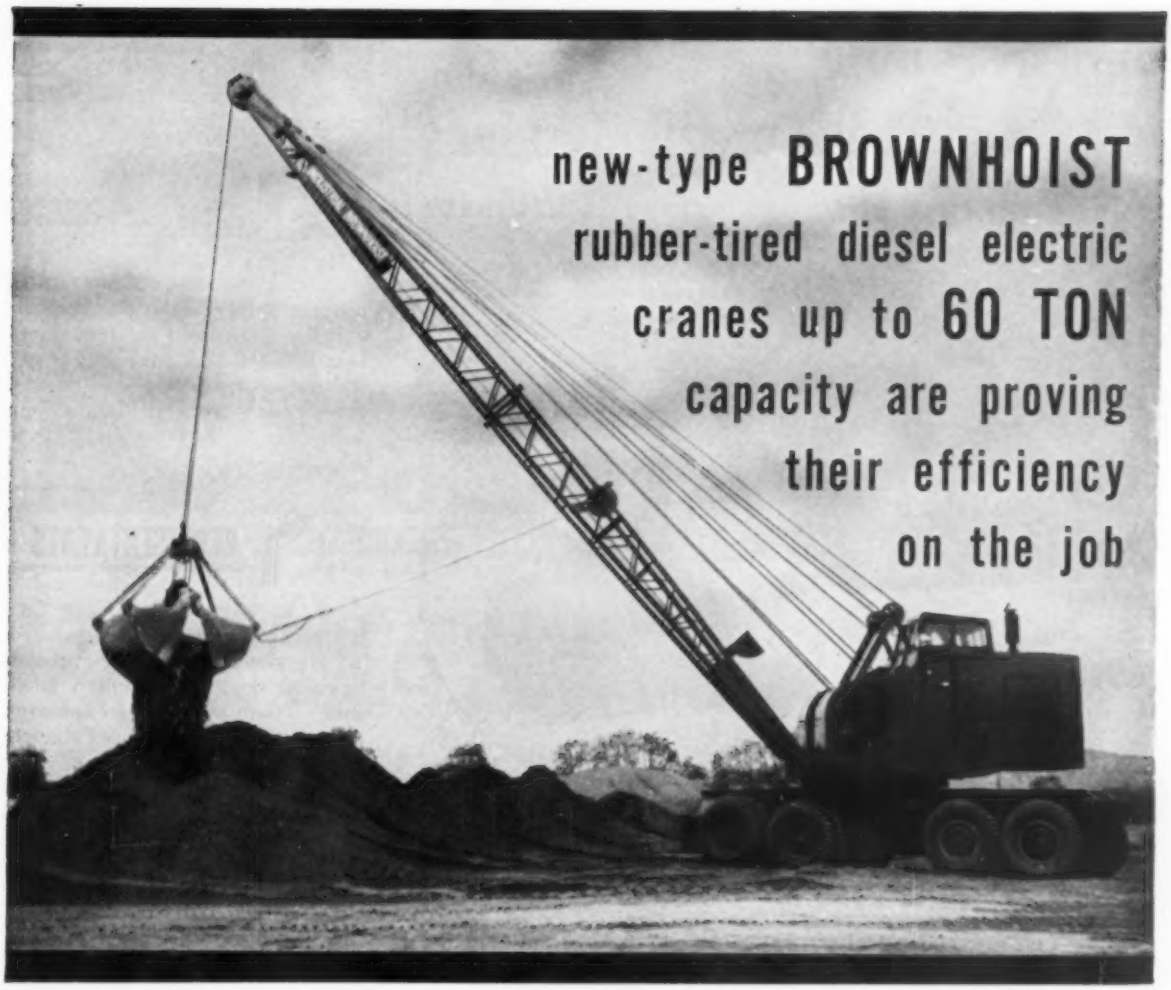
Cleveland Brass Mfg. Co., Cleveland, has bought a 50,000 sq-ft plant formerly occupied by Glauber Brass Co. in Kinsman, O., and will move its operations there. The plant will produce small low-pressure brass valves and fittings for gas and water lines, as well as couplings for the oil industry.

ASSOCIATIONS

S. D. Den Uyl, president of Bohn Aluminum & Brass Corp., Detroit, was elected president of the **Aluminum Association,** New York. Other officers are: Honorary chairman, Arthur V. Davis, Aluminum Co. of America, Miami, Fla.; chairman, E. G. Fahlman, Permold Co., Medina, O. Vice presidents are: R. B. Caples, Anaconda Aluminum Co., New York; W. E. Dunlap, Aluminum Extrusions Inc., Charlotte, Mich.; and F. R. Nichols, Nichols Wire & Aluminum Co., Davenport, Iowa.

D. M. Allgood has been appointed executive vice president of the **Drop Forging Association,** Lansing, Mich. C. H. Smith Jr., Steel Improvement Forge Co., Cleveland, continues as president; Richard Marcus, as assistant secretary-treasurer.

William E. Mahin, past technical director of Vanadium Corp. of America and a management con-



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BROWNHOIST MATERIAL HANDLING EQUIPMENT GIVES A LIFT TO AMERICAN INDUSTRY

INDUSTRIAL BROWNHOIST CORPORATION
BAY CITY, MICHIGAN • DISTRICT OFFICES: New York, Philadelphia, Cleveland, Chicago, Denver, San Francisco, Montreal • AGENCIES: Detroit, Birmingham, Houston

SUBSIDIARY OF Penn-Texas CORPORATION

The new Brownhoist Wagon-Cranes are specifically designed to do an outstanding job wherever high mobility and high capacity are required. You'll see them at work performing heavy duty jobs in mines, quarries, steel mills, for railroad and lumber operations and for many other large industries. Equipped with dynamatic clutch, anti-friction bearings at all essential points, power steering, electric travel and electric rotation. Mounted on a 12 wheel crane carrier capable of speeds up to 8 miles per hour, the unit can be operated by one man from easy-to-reach controls. Economical to operate. Available in capacities from 25 to 60 tons. For specification folder or further details, get in touch with our nearest representative or write us at Bay City.

BROWNHOIST

Abrasive Cutting | *the best way to cut many materials the only way to cut some*

Campbell Cut-Off Machines

WHAT KIND OF A CUT DOES YOUR JOB REQUIRE?

THIS Clean, smooth edges that require no further finishing

or THIS Rough, serrated edges that must be machined if smooth finish is required

● The smooth cut—made on a CAMPBELL Oscillating Wet Abrasive Cut-Off Machine and the just-right ALLISON Abrasive Wheel for the job—saves a grinding operation at a Midwest gear plant.

Another combination of CAMPBELL Cut-Off Machine and ALLISON Wheel cuts stainless steel tube twice as fast as by other methods for a large aircraft manufacturer.

Can you cut tough K Monel, 4¾" dia., in two minutes per cut by present methods? Whatever your problem, our abrasive cutting specialists can improve your cutting operation and save you money.

OSCILLATION makes these big cuts with speed and economy

● The cross section of gear teeth (*shown left above*) is cut smooth, fine-finished and ready for metallurgical study.

It results from the wet cut of an Oscillating CAMPBELL Abrasive Cut-Off Machine with abundant coolant applied just where it does the most good. The Oscillation of the ALLISON Abrasive Wheel, the right one for the job, handles big cuts like this with speed and economy.

If your cutting involves alloy or high carbon steel, this CAMPBELL-ALLISON combination just can't be beat.

Let us send you this book

ACCO

Campbell Machine Division
AMERICAN CHAIN & CABLE

925 Connecticut Avenue • Bridgeport 2, Connecticut

sultant specializing in research and development problems, has been elected president of the **Malleable Research & Development Foundation.**

NEW ADDRESSES

Gardner-Denver Co., Quincy, Ill., will move its Philadelphia branch office on Feb. 15 to enlarged quarters at 4309-11 Rising Sun Ave., that city. The firm makes pumps, compressors, rock drills and air tools. G. M. Sitterley is district manager.

REPRESENTATIVES

W. E. Shipley Machinery Co., Philadelphia, has been appointed a Maryland dealer for presses manufactured by **Hamilton Division** (Hamilton, O.), **Baldwin-Lima-Hamilton Corp.**, Philadelphia.

CONSOLIDATIONS

Production Instrument Co., Chicago, maker of mechanical and electric counting devices, merged with **General Controls Co.**, Glendale, Calif., manufacturer of automatic controls.

Ulrich Mfg. Co., Roanoke, Ill., purchased from Bump Pump Co., La Crosse, Wis., its line of industrial and sanitary pumps. All manufacturing equipment and key personnel have been moved to Roanoke. The Illinois firm's production includes earth-moving equipment and hydraulic products. The firm also does machining, fabrication, induction hardening, grinding and finishing operations on parts and structures for other companies.

Appleton Electric Co., Chicago, purchased **Riviera Steel Products Co.**, Los Angeles, and will operate the property as its Pacific Division. Products include outlet and switch boxes and other items for electrical wiring.

"We spent considerable time and effort to find the best possible location for this new plant. Punxsutawney, Pennsylvania met all of our requirements"... says President D. E. Broggi of Neptune Meter Company.

THERE MUST BE A REASON...

Neptune Meter Company built its new 50,000 square foot precision gas meter plant

IN PENNSYLVANIA

"Not long ago, one of our Divisions decided to market an entirely new line of precision gas meters" says Mr. Dante E. Broggi, President of Neptune Meter Company, New York, as he tells why his Company's Superior Meter Division chose a Pennsylvania location for its new meter plant.

"Our production facilities couldn't be expanded to make the new meters, so another plant was needed. Because meters are precision instruments and have to be made with great skill and care, our most important consideration in selecting the plant site was *the kind of people who would be working with us.* This consideration, combined with the others listed below, led to our choice of Punxsutawney, Pennsylvania.

1. "Availability of workers who are capable of performing the skills required of them.
2. "Favorable and friendly attitude of labor in the chosen Punxsutawney region.
3. "The local Industrial Development Fund financed construction of our building on very attractive terms. This type of community spirit assures *continued cooperation* by the people in the area.
4. "The town is within overnight trucking distance of our major markets which spread eastward from the Mississippi to the Atlantic.
5. "Small community living has a strong personal appeal for our technical and scientific personnel. Still, we are only a short drive from Pittsburgh's cultural, educational and research facilities."

"These points make up a hard-to-beat combination . . . and we are thoroughly satisfied that we made the right choice."

To get detailed information on Pennsylvania advantages for your new plant, write or call—

Pennsylvania Department of Commerce
Main Capitol Building, 447 State Street
Harrisburg, Pennsylvania
Phone: CEdar 4-2912

Special reports and tabulations, tailored to your specific location requirements, will be prepared upon request by engineering and economics specialists, covering:

Labor—Availability, skills, rates, surplus areas.

Markets—Consumer, industrial product, state, regional.

Transportation—Water, rail, truck, air transit time, costs.

Building—Availability, sizes, location, descriptions.

Sites—Acreage, topography, utility services, photos, maps; industrial districts.

Financing—Community-state industrial building program, lease-purchase, commercial credit.

Materials—Metals, industrial chemicals, wood, textiles, farm products.

Minerals—Location, reserves, potentials, analyses.

Water—Quantitative, qualitative analyses.

Power—Capacity, network, industrial services, costs.

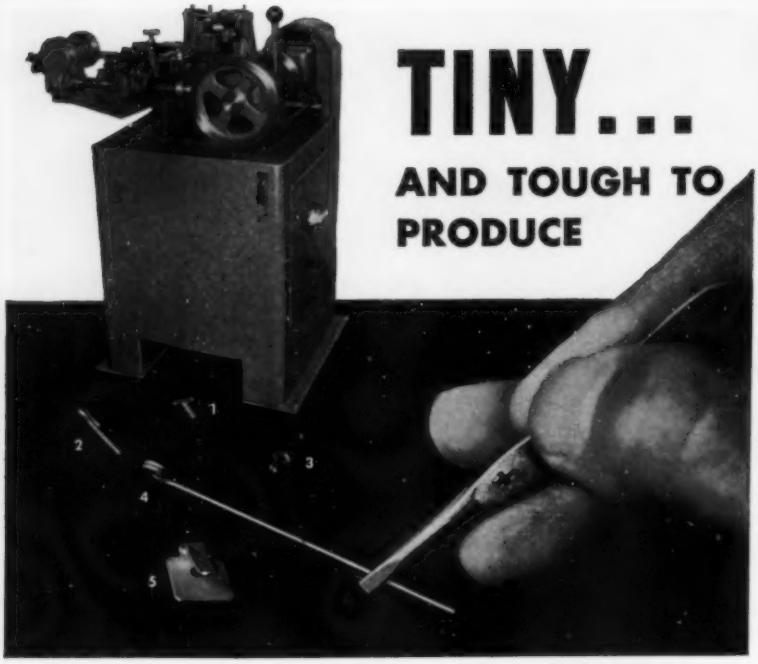
Fuel—Coal, oil, natural gas service, costs.

Engineering—Schools, enrollment, specialization, research laboratories, services.

Taxes—Inter-state and community comparisons, assessment ratios, millages, corporate.

Communities—Characteristics, size, regions, housing, schools, culture, recreation.

Industrial Representatives Available for Inspection Tours, Conferences and Consultations



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Management will be your only exclusive resource in the planned expansion period ahead. You're probably short of trained management people now—and you'll need even more in the next 5, 10 or 15 years. Recruitment isn't an out because the problem is industry-wide. The challenge is clear: You'll have to develop your own managers of tomorrow.

"The Care and Feeding of the Junior Executive," starting on the opposite page, is the first of two articles on the subject in STEEL's 1957 Program for Management series. The second part, "Grooming Middle Managers—Tomorrow's Top Executives," will appear in the Mar. 18 issue. Watch for it.

• *Extra personal copies of these Program for Management articles are available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, Ohio.*

Management Development

The Care and Feeding of the Junior Executive

COMPANIES with an eye to securing their stake in metalworking's fabulous future are starting to lavish as much attention on the junior executive as they do on the senior in engineering school. They recognize that in the next 5, 10 or 20 hectic expansion years ahead (when today's junior will be a middle or top manager) competition will not be one company's product against another's. It will be one management against another!

"Two different companies may be able to show almost identical balance sheets today," says Roy C. Ingersoll, chairman and president, Borg-Warner Corp., "but within a few years one company which has built management in depth, while the other has failed to do so, may be double the size of its competitor. Or the competitor may even have passed out of the picture completely."

So the junior executive finds that he is sharing the spotlight with the engineer—and for the same reason. Both are in short supply.

It's Serious—"American industry is grossly short of well-trained executive personnel, especially at the junior and middle management levels," warns Dr. George L. Bach, dean, Graduate School of Industrial Administration, Carnegie Institute of Technology.

Clark C. Sorensen, director of public and industrial relations, American Machine & Foundry Co., goes him one better. He asserts that the shortage of trained management, particularly at the junior level, is probably more critical than our engineering and scientific manpower deficit.

Why

"This shortage," Dr. Bach continues, "is beginning to hit American top management in the face

Climate for Growth

Climate is variously defined, but it boils down to the kind of working relationship you maintain among your people from day to day. If the relationship is right, it need not be on paper to be successful. In fact, you can't get it all on paper. Climate, like the weather, is seldom ideal, forever changing, and some like it hot; some like it cold. But, like the weatherman, you can forecast with reasonable certainty if you temper experience with common sense.

Here is an excerpt from the "almanac" written (and used) by Reliance Electric & Engineering Co.:

Company Philosophy

A. We believe that our business should be so operated that it provides a quality product at an adequate profit. Proper consideration should be given to the needs of customers, employees, stockholders and the public. Our goal is to continuously improve productivity, and growth, to provide jobs, reward investors, attract capital and provide more and better products and services at lower cost and to more customers.

B. We believe that the proper attainment of our objectives requires the skillful and efficient utilization of men, machines and material.

Philosophy of Management Development

A. We believe that the goals of the company can be achieved best by people who are provided with a business climate that builds strong morale and motivates each person to contribute to his maximum extent, as an individual and as a member of the group, toward the achievement of the company's goals.

B. We believe that to provide this proper climate, it is necessary to develop and maintain a well-qualified management team.

C. We believe that capable management personnel accelerate the growth of a business enterprise. In turn, such growth presents a challenge and creates opportunities for each management group.

D. We believe that to maintain, develop and increase our management skills, a planned program of management development is a must as an integral part of our business operation.

as the present generation of presidents and senior vice presidents suddenly realizes that someone else is going to have to take over —and soon.

"The big gap in the junior executive ranks comes directly from the long 20-year period since 1930, when first the depression and then the war cut down the influx of top quality young men. Coupled with this gap is a heavy concentration of top management personnel in the above-55 levels. No reliable over-all statistics are available, but look at your own company to see if the problem comes home."

One study shows that 44 out of every 100 of our nation's business leaders were under 50 in 1928. Today, the number has slipped to 36.

Alternative?

Pirating may bring some temporary relief, but it cannot be counted upon for the cure. Although most of metalworking's 200,000 or so executives are juniors (men between 25 and 45 at the third level of management), the consensus is that there aren't enough to go around.

Two other factors work against this brand of recruitment. As the junior builds up vested interests, such as pensions, deferred compensation and bonus plans, his roots go deeper. It's hard to lure him away from his job. Pirating also attracts the chronic job hopper. The value of his services is highly suspect.

So

It's fairly well agreed that robbing Peter to pay Paul won't work in the long run. The problem is to get more executives—particularly juniors—in total. An added incentive is offered by Economist Peter Drucker: Over the next 20 years, we will have a rapid rise in total population without a comparable increase in the nation's working population.

Clearly, the problem does not lend itself to a simple "make or buy" decision.

It's equally obvious that you no longer can afford to rely upon

the hit-and-miss Horatio Alger system to supply the depth of executive talent you need.

Industry is answering the challenge with probably the biggest do-it-yourself program in its history.

Building Managers

Management development programs vary a great deal in detail, but those which are doing a job of getting juniors ready to be seniors have these things in common:

1. A continuing inventory of management talent which is based upon periodic evaluation of each individual's performance.

2. A continuing estimate of short and long term management needs.

3. A continuing training program (formal or informal) which is based upon needs discovered through individual evaluation.

4. A plan (written or unwritten) to integrate the three points above and to provide the climate needed to get results.

Hooker—Although the first three phases call for a great deal of know-how and good judgment, the men are separated from the boys when you get down to making the plan work because management development involves human beings.

You can get the desired performance from a machine by making it run to the tune of a set of written rules. But you can't make a junior "run" unless he wants to; and you can't help him run by looking after his care and feeding as you would a "standard" machine.

The junior's diet must be supplemented daily with liberal amounts of human relations—often called the climate for development. This "special" diet must be initiated at the top, and it must be maintained by all levels above the junior, from the president of the company down to the junior's immediate superior.

Look Out!—The importance of down-the-line responsibility for climate cannot be overstressed. Programs fail for a number of reasons, but two which make for poor human relations stand out:

1. A program can be scuttled by the executive who pays only lip service to human relations. He says he's too busy to be bothered with the training of others.

2. A program can be scuttled by the executive who feels insecure because his company has a program. He fears that he is training a junior to take his place.

Solution—Both problems can lead to ulcers, but they are not insurmountable. You can sidestep them by making it clear that management development is a critical part of the executive's job—in the opinion of many, it should take 30 to 50 per cent of the executive's time. In judging his performance, put "ability to develop subordinates" high on the list of qualities he must have if he hopes to go places in your organization.

Balance—You won't have any more luck than the fisherman who forgot his bait if your climate isn't right, but this doesn't mean that the tools aren't valuable. They offer you a systematic way of setting up and running a program. Each has a specific function.

The remainder of this article deals with how-to aspects of getting the junior ready to climb

He Looks Like This

"Good executives (and potential executives) are fat and thin, tall and short, bald and heavy-thatched, clean-shaven and bearded—in fact, they look like other men who are not business leaders," observes the Small Business Administration.

What makes them different?

Dr. G. L. Bach, dean, Graduate School of Industrial Administration, Carnegie Institute of Technology, notes five below-the-surface qualities:

1. The orderly ability to size up problems and reach action decisions on the best facts available.

2. The ability to deal effectively with people and to get people to work effectively toward a common goal.

3. The instinctive acceptance of responsibility.

4. A thorough understanding of the interrelations between his business and the economic, social and political forces of the entire environment.

5. The imagination to sense what is fundamental in the rapid change of modern industry and modern society. (No human trait is more common than to do what seems comfortable, accustomed and secure. The executive who tries to keep on building buggies in the air age, or who insists, "the way I learned to do it is the best way," is commoner than many of us like to admit.)

higher on the ladder. Appropriate tools also will be covered.

Foundation

As suggested, a program may look good on paper, but it won't work automatically. The case is stated by Melvin H. Baker, chairman, National Gypsum Co.:

"You can buy a man's physical presence in a certain place; you can even buy a measured number of skilled muscular movements per hour; but you cannot buy enthusiasm; you cannot buy initiative; you cannot buy devotion of heart, mind and soul."

Bedrock — More than anything else, the junior wants two pieces of information: How am I doing? Where am I going?

Whether your program is formal or informal, the secret of success hinges largely upon how well you answer those questions.

11 Keys

Many of the specifics involved are covered in this counsel from Lawrence A. Appley, president, American Management Association:

"Individuals usually produce more (and develop) when they know:

"1. What they are supposed to do.

"2. What authority they have.

"3. What their relationships with other people are.

"4. What constitutes a job well done in terms of specific results.

"5. What they are doing exceptionally well.

"6. Where they are falling short.

"7. What they can do to improve unsatisfactory results.

"8. That there are just rewards for jobs well done and exceptionally well done.

"9. That what they are doing and thinking are of value.

"10. That the boss has a deep interest in and concern for them.

"11. That the boss is anxious for them to succeed and progress."

Map—If you design your program around those key points, it is headed in the right direction. The tools for each job are available.

For example, written job specifications will tell the junior what he is supposed to do, what his authority is, what his relationships with other people are.

Periodic evaluation will let him know what is expected of him, what constitutes a job well done, what he is doing well, where he is falling short, what he can do to improve himself.

The last four points (recognition) are within the jurisdiction of the people who are primarily responsible for the junior's performance and progress, but a written statement of your industrial relations policy will give the junior the official word on where the company stands on such matters.

Next—Before you get into the details of a program, you should go through several preliminary steps, which will include getting a firm idea of how many juniors you need. In the process, you'll be letting them know (at least through the grapevine) that you are looking out for their future.

Stepping Stones

Two kinds of tools are used here. One set is in the "where am I going?" and "how am I doing?"

28 Winning Plays

The care and feeding of the junior is largely the responsibility of his immediate superior. Continental Can Co. Inc. puts it this way: "Every man in a supervisory capacity must continually educate and train those who report to him." General Electric Co. says this calls for "leading by persuasion rather than by command."

Here are some tips for the coach. (They're adapted from information supplied by the Small Business Administration.)

1. Make him want to do things.
2. Find out what makes him tick.
3. Be a good listener.
4. Criticize constructively.
5. Criticize in private.
6. Praise in public.
7. Be considerate.
8. Delegate responsibility to him.
9. Give credit where it is due.
10. Avoid domination.
11. Show interest, appreciation.
12. Lead by suggestion.
13. Give reasons for a request.
14. Let him in on your plans at an early stage.
15. Don't forget: You set the style for him.
16. Play up the positive.
17. Be consistent.
18. Reflect confidence in him.
19. Ask him for counsel.
20. Listen to his ideas courteously.
21. If his idea is adopted or discarded, tell him why.
22. Let him carry out his ideas.
23. Admit your mistakes.
24. Be careful what you say, how you say it.
25. Don't be upset by moderate grousing.
26. Give him a sense of importance.
27. Give him a goal to shoot for.
28. Keep him informed on all matters that affect him.

areas; the other defines the junior's job. They are generally considered in this order:

1. Evaluation: This step is vital. In the process of finding out how the junior is doing and where he is going, you are building up a fund of information on your organization's strengths and weaknesses: You are making an inventory of what you have. You are also determining the development needs of each junior—the only sound basis for your program.

2. Estimates: Short and long term management needs—1, 5, 10, even 15 years ahead—are determined. They are based on such things as anticipated retirements, deaths, expansion needs and normal turnover. This record must be kept up to date.

3. Written job descriptions: The junior, under the supervision of his immediate superior, defines his job in terms of authority and responsibility. Two side benefits result: Specifications for each job are developed, and channels of authority are delineated.

4. Organization charts: Information gathered in the steps above is generally incorporated into an organization chart which may take any number of forms. Some companies, for example, make projected charts which show vacancies over the periods covered by the inventory. Others add a dimension by using results from individual evaluation to indicate possible lines of succession. Color codes, variations of flow charts and other devices are used to depict who is immediately promotable, who needs further development, who is doing an unsatisfactory job.

Framework

In evaluating the junior (and building a framework for your program) you will want objective standards to help you judge his performance and potential.

You can get into myriad details here, but the backbone of any standard is suggested by American Institute of Management.

Blueprint—"Simply put," advises A.I.M., "the executive makes decisions and assumes responsibilities. Usually, he also selects, trains and guides subordinates and gives counsel to a board, a president or other executive.

"To fulfill his function completely, the executive must have various capabilities. He must also have the industry and integrity to apply these abilities to the job he holds and the company that employs him."

Handy Tool—You can get a pretty accurate idea of how your juniors measure up to that profile of the modern manager by using a check list the A.I.M. has developed for the selection of executive talent. It covers:

ABILITY — which includes intelligence, professional skill and

This Junior Job Hopped

Why is a promising junior who is in his early thirties, married, has children and paying on a home willing to change jobs when the right opportunity presents itself?

STEEL interviewed such a man after he had enough time on his new job to compare it with the one he left. Although one sample does not make a survey, the results are borne out by the experience of personnel relations people.

You can't buy loyalty with money or an elaborate management development program. You have to earn it.

For example:

Q: You say you had plenty of responsibility on your old job, but you still prefer the new one. Why?

A: Fourteen men and a boy aren't checking over my work. I'm not expected to be right 100 per cent of the time.

Q: But you say you felt secure in the old job?

A: I knew I had a job for life if I wanted it.

Q: What about your chances of advancement?

A: The same old story. I felt trapped—at least temporarily. Four of us had been told "'privately" that we had been earmarked for a particular job on up the ladder. Opportunities that arose outside the department were "played down" by my boss.

Q: That's why you changed jobs?

A: I don't think so. People are people wherever you go.

Q: Did you shop around for the new job?

A: No. It came to me. I would have been foolish to leave a good job just because of some normal irritations. Let me put it this way: I didn't go out and look for another job because of them, but they did have a definite influence when the right opportunity came along. The same thing goes for money. Of course, I'm making more on the new job, but as I said.

leadership (the ability to work with and through people).

INTEGRITY—which is essentially a sense of responsibility and honesty. (Not merely trustworthiness but the intellectual sincerity that results in independent thinking, impartial judgment and the free expression of ideas.)

INDUSTRY—which consists primarily of diligence and initiative. Diligence includes not only willing performance but efficient attention to tasks as they merit it. Initiative is resourcefulness and the desire to improve.

Nuts and Bolts—Of course, you form impressions of how the junior is doing in your day-to-day contacts with him, but formal evaluation is a must because it gives you an organized way of going at it. It forces you to crystallize your thinking and commit it to writing.

Generally, three persons are involved in the interview: The person being appraised, his immediate superior and another officer who knows him and his work—often his former superior.

His immediate superior, who is in charge of the interview, is encouraged to use great skill in human relations. Good practice is to talk about strong points first. Weaknesses are discussed constructively. Specific improvement plans are made and followed up.

Practice varies, but most formal evaluations are on a semi-annual or annual basis.

Question for the Junior

Are you willing to pay the price?

There is great wisdom in this caricature of an executive by Dr. Harry Levinson of the Menninger Foundation:

"As nearly everyone knows, an executive has practically nothing to do,

"except to decide what is to be done; to tell somebody to do it; to listen to reasons why it should not be done, why it should be done by someone else, or why it should be done in a different way; to follow up to see if the thing has been done; to discover that it has been done incorrectly; to point out how it should have been done; to conclude that as long as it has been done, it may as well be left where it is; to wonder if it is not time to get rid of a person who cannot do a thing right; to reflect that he probably has a wife and a large family, and that certainly any successor would be just as bad, maybe worse; to consider how much simpler and better the thing would have been done if one had done it oneself in the first place; to reflect sadly that one could have done it in 20 minutes, and, as things turned out, one has to spend two days to find out why it has taken three weeks for someone else to do it wrongly."

Schoolhouse

Programs fall under two main headings: On-the-job training (which will be discussed later) and other forms of training which will further broaden the junior's experience and outlook. Both phases must be tailored to the individual's needs.

Stretchers — To broaden its juniors, American Machine & Foundry offers courses in conference leadership, effective speaking, effective letter writing, creative thinking, speed reading and cost management. Attendance at seminars and meetings sponsored by technical and professional organizations is encouraged, and the individual is urged to continue his education at accredited colleges and universities.

The possibilities are legion. They include such diverse activities as junior boards, role playing, community leadership, assigned conference leadership, guided reading programs and special outside management courses.

Schoolroom

Essentially, three groups of individuals are involved in a development program: Top management, the junior's immediate superior and the junior.

Top management must create and maintain a proper climate for growth.

The immediate superior (generally a middle manager) is responsible for the junior's continuous on-the-job training.

The junior has two responsibilities. He must strive to do his present job better, and he must have the desire to develop himself still further.

Weather — Climate is described this way by Michael G. Blansfield, supervisory training officer, San Bernardino Air Materiel Area:

"It is the attitude of top management, as manifested not so much in words (for they can be elusive and unwittingly deceptive) as in actions, in management's way of expressing itself and its method of doing things.

"These things establish the climate in which every development program must function. In many instances, this climate is free

and wholesome, and then development really occurs.

"In other companies, often despite all outward appearances, the climate is a regressive one which causes the concept of development to falter and eventually to die."

Coach — In its "Development Activities Guide," the Cleveland Electric Illuminating Co. states:

"On-the-job development is the most important development medium in use at the company. It is the primary responsibility of every line supervisor.

"Since no two individual cases are alike, it is impossible to establish specific rules. Success . . . depends upon the supervisor's taking a well-planned imaginative approach to the problems of motivating his employees . . . creating day-to-day work situations which are conducive to self-development."

Tips—Based on the Illuminating company's experience, here are some ways the coach can develop the junior on the job:

1. Designate him as acting boss in your absence.
2. Encourage him to ask about and make suggestions concerning activities outside his immediate area of authority.
3. Delegate authority and responsibility to him—in other words, decentralize some of your authority and responsibility.
4. Assign him to projects involving contacts with people in other departments and people at higher levels in the company.
5. Assign him challenging projects which require superior technical or managerial skills.
6. Assign him tasks which require exceptional proficiency in personal skills — such as public speaking or writing an article for publication.
7. Establish high standards of performance by example.

Junior—It has been said that the right kind of junior has wrinkles in his gray matter and ants in his pants. General Electric Co. defines his role this way:

"Development is primarily the responsibility of the individual himself. The company does not develop men; they develop themselves. The company should offer help, guidance and opportunity, but these must all be related to the man's ability."

Goal—No doubt about it, the junior of today has his work cut out for him. His degree in engineering, science or business administration may have helped him move up the ladder, but his training and experience as a specialist do not qualify him as a modern manager.

To a degree, management is (and will continue to be) an art, but it also has become a science. The intuitive manager who flys by the seat of his experience is fast becoming obsolete. Modern management requires the ability to work with and through people. It also calls for the ability to think creatively atop a mountain of subtly interrelated facts—and the job will get tougher as we move farther into automation.

Big Picture — Mr. Blansfield wraps up the over-all job of management development this way:

"More is required of a good crop, of course, than a favorable climate. The seed must be right, and it must be skillfully planted and tenderly cultivated."

Harvest

You'll stand a good chance of reaping your full share of metalworking's fabulous future if you follow that advice.

Goodyear Tire & Rubber Co. has had management development programs for a number of years. Observes T. W. Prior, the company's director of training:

"Look at our most representative manufacturing plants, a total of

How Many Do You Need?

Lyndall F. Urwick, the British management consultant, thinks industry should have at least two candidates for each position at the time it becomes vacant. To fulfill that requirement, he recommends a 4:1 ratio for selection and training. Two of the four trainees, he explains, will be eliminated before the opportunity for promotion crises. Here are his reasons:

1. Death or total disability will eliminate 25 per cent.
2. Disabilities which make a man unfit for higher responsibilities will eliminate 25 per cent. They include:

A. Ulcers, nervous disorders, cardiac trouble, obesity and other occupational diseases of the "rat race."

B. Matrimonial entanglements or breakdowns leading to emotional instability and/or, sometimes, alcoholism.

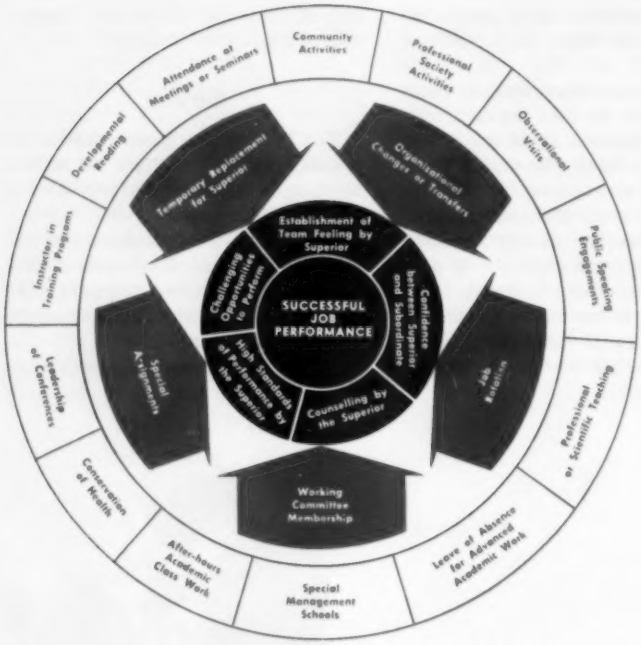
C. Financial unreliability.

D. Excessive personal ambition, making the individual inacceptable to his colleagues or incapable of conducting his rivalries without intrigue and dishonesty.

E. Premature aging. Some men go over the top of the curve of their maximum usefulness as executives at 45 or 50.

A Development Plan

Monsanto Chemical Co. depicts its program this way:



Note how the elements are graded. Management development depends upon:

1. Successful job performance (of the junior in this instance).
2. On-the-job coaching by the junior's superiors.
3. In both instances, the right kind of climate for growth is maintained.

The outer ring concerns activities and experiences outside the normal run of executive duties. They help to broaden the outlook and increase the effectiveness of the junior.

16 domestic and 14 foreign plants. Where did the men who are running them come from? Out of this group of 30 Goodyear plant managers, 24 started in the Akron flying squadron."

Three Challenges

So much for the care and feeding of the junior executive.

Stand back and take a look at your program. How are you doing? What is your answer to these challenges?

1. Is your over-all program aimed at the right target?

2. Are you selecting the junior soon enough?

3. How sound is your program?

Lyndall F. Urwick, the British management consultant, makes some provocative observations on the first two points in *Management Education in American Business*—an American Management Association publication which was sponsored by the Ford Foundation's Fund for Adult Education.

1. Right Target?—Although on-the-job training is indispensable, Mr. Urwick has doubts about the way industry is using the valuable outside training courses, such as those offered by the Harvard Graduate School of Business Administration, the American Management Association, Case Institute of Technology and others. Almost without exception, he points out, this training is made available only to middle and top management. The entrance requirements of one management development school, for example, call for a minimum of 15 years' experience in industry.

2. Soon Enough? — Mr. Urwick throws out this thought:

"Least attention is paid to the newcomer. Once the induction period is over and he has ceased to be a 'new boy,' he is usually tucked away in some subordinate position in plant or office to 'win his spurs.' . . . Only after he proves himself by the patient performance of routine work, which usually makes little call on his intellectual or creative faculties, is he given some indication of the possibilities which lie before him." And this comes "probably after rather than before the age of 30."

Referring to the example offered by West Point and Annapolis, Mr. Urwick continues:

"These institutions have realized that they will need leadership in the future and the best time at which to teach leadership is when a man is young and impressionable. Hollywood put it tersely many years ago: You cannot groom elderly spinsters to stardom."

3. Sound Enough?—This challenge is suggested by Mr. Prior of Goodyear. He reminds us:

"The methods and tools used are not so important as a sincere interest in the development of people. Executive development must include a good program of executive apprenticeship; and the over-all plan must be a long-range one, grounded in sound personnel planning and training.

"The basis of our philosophy of executive apprenticeship is as old as the lesson that you will find in Matthew 7:24-25:

" '. . . I will liken him unto a wise man, which has built his house upon a rock;

" 'And the rains descended, and the floods came, and the winds blew, and beat upon the house, and it fell not: For it was founded upon a rock.' "

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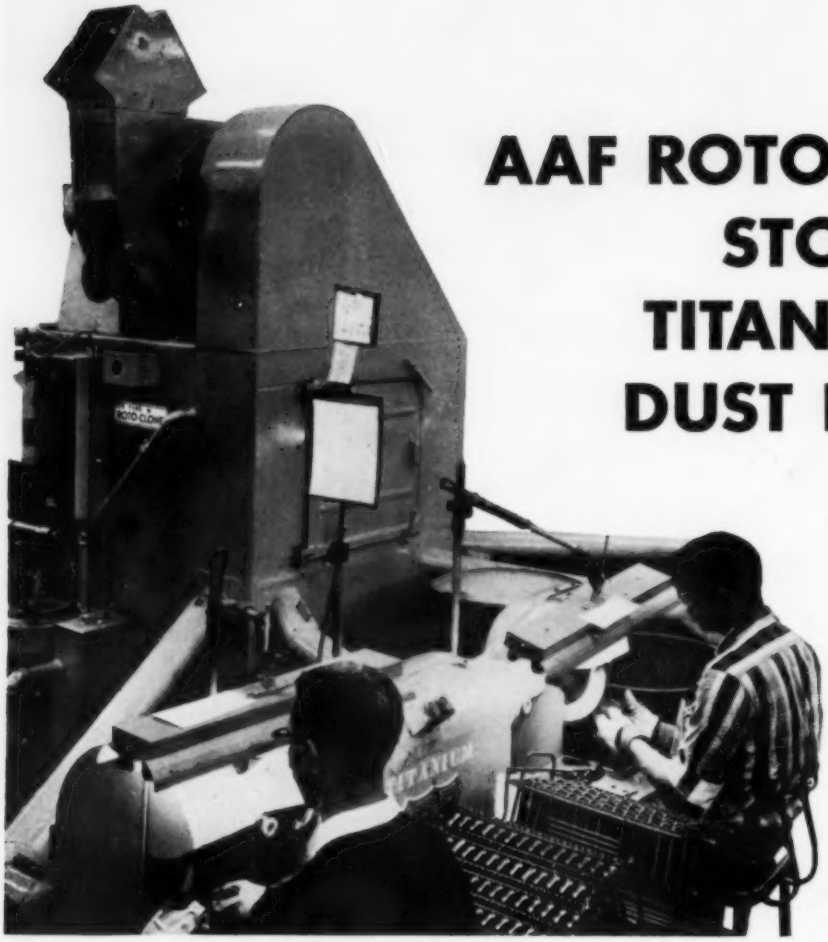

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Wet-collecting Type N ROTO-CLONES take the danger out of titanium buffing

A small spark can quickly ignite titanium dust, and spread a flash fire to dust in ducts and bins. Those dust control systems attached to polishing and buffing operations can be major offenders. The answer to these titanium dust producers is wet-collecting AAF ROTO-CLONES. The top "fireman" is the rugged Type N ROTO-CLONE. The high cleaning efficiency (and inherent safety) of this hydrostatic precipitator is the result of the combined action of centrifugal force and the thorough intermixing of water and dust-laden air.

Solving "new" dust problems like this one is nothing new for AAF. We've been doing it for more than a quarter-century and it has led to the development of industry's most complete line of equipment. For more data on the Type N ROTO-CLONE, call your nearest AAF representative or write direct for Bulletin 277.

AAF Herman Nelson

American Air Filter
COMPANY, INC.

443 Central Avenue, Louisville 8, Kentucky
American Air Filter of Canada, Ltd., Montreal, P. Q.

Air Filters and Precipitators

Illinois Heating Specialties

BETTER AIR IS OUR BUSINESS

Herman Nelson Unit Heaters

Herman Nelson Portable Heaters

STEEL
February 11, 1957

Technical Outlook

MAGNETIC MATERIALS— Two new developments: Indiana Steel Products Co., Valparaiso, Ind., announces Indox V, an oriented ceramic permanent magnet with energy 3½-times that of conventional ceramic magnets. It's well suited, says the company, for applications such as medium sized, direct current motors, synchronous drives, traveling wave tubes, high fidelity loudspeakers, magnetic clutches and a variety of tractive devices where size is important.

Bell Telephone Laboratories, New York, has developed a magnetic alloy useful for miniaturization (without sacrifice of performance) or for high temperature operation. Called Supermendur, it soon will be made by several licensed companies.

HI-FREQUENCY WELD— Instead of inducing heat in a buttweld (like those in welded pipe), an eastern firm puts contacts on the metal. A 450,000-cycle current produces a fast weld with little pressure, an exceptionally narrow heat affected zone and little flash. The method, developed by the New Rochelle Tool Co., New Rochelle, N. Y., welds ⅛-in. mild steel at 100 fpm.

BRUSH PLATED— Here's a twist on inexpensive ways to plate steel: Tube Reducing Corp., Wallington, N. J., puts a 0.001-in. nickel plating on 1½-in. steel pipe with a brush. It's a mixture of nickel oxide and dibasic ammonium phosphate that reduces to pure nickel, nickel phosphide, water and ammonia in a closed furnace at 1800 to 2000°F. The process is patented.

MOLY DISILICIDE— This high-temperature material, more familiar as a coating or lubricant, can be formed into structural shapes by hot pressing, sintering or casting. Shapes resist oxidation at 3000°F, have greater stress-rupture strength at 1800°F than cemented carbides, steel alloys, cermets and unalloyed molybdenum. High purity $MoSi_2$ powder is available from Electro Metallurgical Co., a division of Union Carbide & Carbon Corp., Niagara Falls, N. Y., Fansteel Metallurgical Corp., North Chicago, Ill., and Sylvania Tungsten & Chemical Division, Sylvania Electric Products Inc., Towanda, Pa.

PLASTIC BEARINGS— A German design study reveals that five plastics, tested in roller bearing race separators, exhibited better critical operating properties than bronze or steel—including behavior under unfavorable conditions, such as failure of lubrication, high local loading because of improper installation and excessive speed. The Office of Technical Services, U.S. Department of Commerce, says plastic bearings have been widely substituted for metal bearings in German industry.

COLORING COPPER— Enthone Inc., New Haven, Conn., says it has a new process (called Enthocolor 220) which produces brown or shiny blue-black coatings on copper and its alloys. Because the finish is an oxide, crystal spotting, such as may take place with colored sulphide finishes, is eliminated. Adhesion is good. Work can be severely deformed without flaking.

HIGH TEMPERATURE ALLOY— GE research people have come up with J1300, a new iron base alloy for structural sheet components in jet engines. Operating range: 1200 to 1400°F. Statistics: Its strength to weight ratio is 25 to 40 per cent better than that of other alloys for this temperature range. It can be used 100°F higher than present alloys. General Electric Co.'s Metallurgical Products Department, Detroit, is turning out prototype quantities.

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Fast Start for 200 Series

It's still only a drop in the stainless bucket, but there's hopeful news in the widening circle of users. Mills expect quiet, steady growth for 201 and 202

Expander spacers for piston oil rings, made of type 201 stainless by Sealed Power Corp., Muskegon, Mich. A minor use tonnagewise, it's typical of ways in which the 200 series has to grow. In this case, 201 was chosen over other stainless grades because of its better service performance

STEEL MILLS poured 1800 tons of 200 series stainless steel ingots in 1955. In 1956, they poured 18,000 tons, a tenfold increase.

For most materials, this would be a flying start, but 201 and 202 have far to go. Frankly, these lean nickel, high manganese steels are designed to take over much of the work now done by the popular 18-8s. Except in transportation equipment, they've barely scratched the surface. There's plenty of resistance to discarding the familiar 300 series in favor of the newcomers.

Not So New—Actually, the Cr-Ni-Mn stainless steels aren't new. In one form or another, mills have been working with them since the late thirties. But it was early 1955 before they received AISI sanction and the 201 and 202 labels.

They got an excellent send-off: A 2 cent a pound price differential over 301 and 302; plenty of publicity on the patriotic and economic necessity for conserving nickel; the backing of many years of tests to show that they could take over 300 series jobs in all but the most corrosive applications.

There is no doubt in the minds of the producers (Allegheny Ludlum Steel Corp., Republic Steel Corp., U.S. Steel Corp., Washington Steel Corp. and Crucible Steel Co. of America) that 201 and 202 are all they say they are and more. But customers have been dragging their feet.

Few Takers—The reasons they give are a textbook example of the difficulties of marketing a new product:

1. Resistance to change: "What we are using is doing fine. Why upset the apple cart?"
2. Self-assertion: "If there's 18-8 to be had, I want my share."
3. Promotion: "We advertise our product as 18-8. Our sales force would scream and our competitors would chop us up if we switched."
4. Price: "It's actually cheaper for me to buy the higher priced material because of the high price of 18-8 scrap."
5. Disbelief: "Maybe it's just as good, but I'll let the other fellow find out for me."

There are good answers to each of these attitudes, and some notable exceptions to the holdouts—the Budd Co., Philadelphia, for example. Budd is thoroughly convinced that 201 will do all that 301 did in railway coaches and highway trailers. This company is by far the largest single user of 200 steels.

Takers—Other companies have tried experimental quantities and have become enthusiastic. One of the latest is the Sealed Power Co. of Muskegon, Mich., which is making oil ring expander spacers for pistons in 1957 cars.

Type 201 performs even better than the type 301 previously used. Because of its excellent heat resistance, it retains its strength under operating conditions. Corrosion resistance also is good.

Bunke-Musser Co., Jackson Center, O., is using 0.125 in. thick 201 for automobile safety belt buckles. They must withstand a 1500-lb pull and release with 45 lb of pressure when under a tension of 125 lb. Under these conditions, the hard surface of 201 resists galling, a problem with softer stainless. The company finds stainless is much cheaper than carbon strip, which would have to be chrome plated and polished to serve the same use.

The Field—Types 201 and 202 are beginning to appear in hardware, architectural panels, automobile trim, cookware, table flatware, restaurant equipment, appli-

The 200 Series Market

	Present Uses	Immediate Prospects
Architectural	Exterior panels, window frames, doors, hardware, elevator panels.	Steady growth, with occasional spurts in curtain wall panels for large buildings.
Transportation	Railway car and truck trailer bodies. Automobile wheel covers, trim, piston ring expanders, roofs, windshield wiper parts, safety belt hardware.	Bus trim and hardware, mufflers, radiator parts, trailer and railroad car tanks, manifolds, valves.
Dairy & Food Processing	Parts not in contact with milk for dairy equipment. Fruit juice processing machinery and tanks. Beer barrels, soft drink vending machine parts, soda fountain equipment.	Bulk milk coolers and farm holding tanks. Canning and food processing equipment. Dairy equipment growth depends on dairy association approval and changes in state and local sanitary codes.
Restaurant & Institutional Equipment	Coffee urns, mixing bowls and cooking utensils, cabinets, stoves, refrigerators, work surfaces, sinks.	Institutional furniture and kitchen equipment. Use by custom fabricators should rise markedly.
Household Utensils & Appliances	Cookware, coffee makers, teakettles, flatware, kitchen tools, sinks, refrigerator doors, wall panels, hoods, range parts, food mixer parts and bowls, barbecue equipment, steam irons, washing machine tubs and other parts.	Appliances of all types, especially for exterior surfaces and trim. Considerable growth in cookware and built-in kitchen units. Water heaters.
Miscellaneous	Wash fountains, hose clamps, pole line hardware, capacitor cases.	Laboratory and scientific equipment, fasteners, weldments of 204 and 204L.

ances, fruit juice tanks, beer barrels, hospital equipment and electronic parts.

These are typical 18-8 (and 430) applications, and the 200 series has opportunity for growth in all of them.

There have been few objections based on fabricating difficulties and service failures. Many users, in fact, remark that they can't tell the difference between, say, 201 and 301. Others like the additional cold strength factor, the silvery color, the ease with which the new materials take a polish. Fabricating equipment and techniques for 300 grades seem to work equally well with 200 grades.

Mill Problems—The price differential (it's now close to 3 cents a pound) is a real bargain from the mill point of view. Rolling experience with these steels has not been without its headaches. When Allegheny Ludlum started working with them, it had to double convert (anneal twice) for cold finishing, but those days are past.

U.S. Steel points out another problem: Few users of narrow strip (1 to 3 in.) have appeared, so hot bands have to be ordered close to cold finish width to avoid trim wastage. With mills working near capacity, this creates a scheduling problem which will be resolved as 200 series volume goes up.

New Grades—The 200 series may eventually come up with a match for each 300 grade in the 18-8 category. Already, 204 and 204L are being poured in trial-size heats. There's some feeling that the 200 series will meet stiff competition from still newer grades of austenitic nickel-conserving stainless.

One possibility: The Cr-Mn-N steels. U.S. Steel's Tenelon is an in-production example. In this no-nickel material, the combination of manganese and nitrogen produces an austenitic structure over a wide temperature range. Physicals are unusually high: Tensile strength of 125,000 psi and 45 per cent elongation in 2 in. at room temperature for annealed flat rolled material. Corrosion resistance in strong acids falls between types 301 and 430; in weakly corrosive media it appears to be the equal of the popular stainless grades.

Conservation—In the final analysis, the availability of nickel will determine whether lean nickel stainless (Cr-Ni-Mn, 200 series) and no-nickel grades (400 series and Cr-Mn-N) ever take over a major portion of the 300 series market. If Secretary of Defense Charles Wilson means business in his pronouncements on nickel conservation, these materials are ready to perform good service in 85 per cent of 300-series applications.

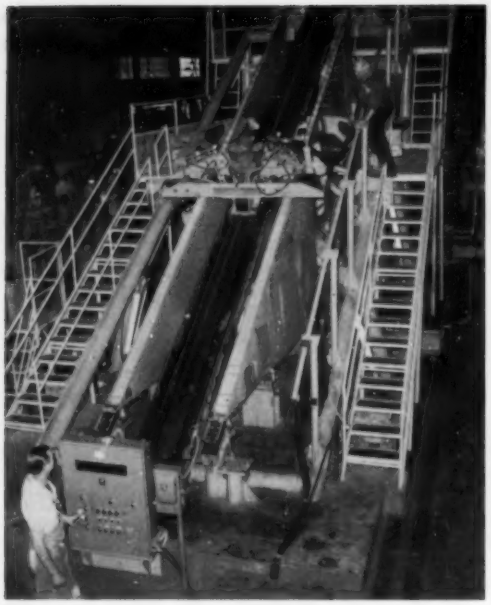
The Army Quartermaster Service and the Navy Bureau of Ships are beginning to show an interest in 200 steels for such items as field laundry units and dishwashers. New military specifications will probably recognize them soon. An example needs to be set by the military, but as long as there is a little nickel available at any price, it will be hard to pry users away.

200 Series Production: Off the Ground but Far To Go

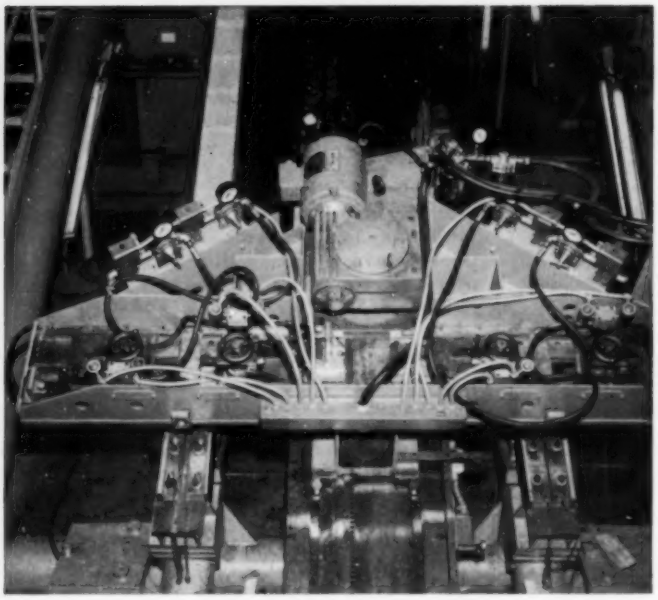
(Net tons of ingots)

	201	202	301	302
1955	1,190	696	84,121	213,578
1956*	11,500	7,100	50,000	201,000

*Estimated from nine-month returns.



Carrying four cutter heads, the bridge moves up the ways. It's trimming leading edges of two wings



Close-up shows four handwheels used to raise and lower the cutting heads. Also shown: Motor that drives bridge up ways

Machine Makes Interchangeable Wings

Aircraft builder uses a special machine to trim nearly 96 per cent off the time needed to finish cut three critical surfaces on wings for supersonic jet planes

SPECIAL machines usually aren't mentioned in the same breath with short-run production. Their inflexibility ordinarily makes a job shop operator look the other way.

Aircraft builders are an exception. Complicated shapes and close tolerances often force them to special machines. A trim and boring machine for jet wings is a good example.

Combination—C. E. Roye, assistant supervisor, Convair, a division of General Dynamics Corp., San Diego, Calif., calls the machine a combination machine tool and fixture. It locates and holds two delta wings and trims the machined wing skin along the leading edge spar. While the wings (they're for the F-102A supersonic jet) are in the machine, the main gear trunnion points are bored and faced, and a recess is cut in the skin around the main wheel well.

All three jobs now take 2½-hours at most. With previous methods, the same operations took 60 man-hours.

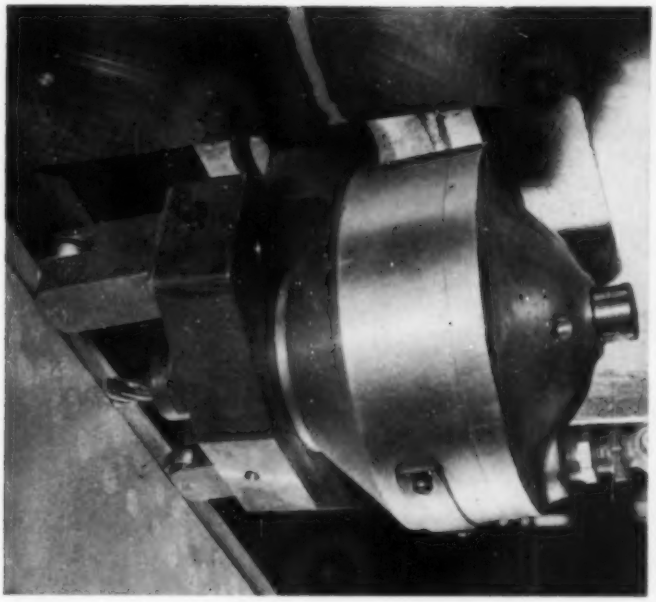
In addition to cost and time savings, Mr. Roye says, Convair gets complete interchangeability of wings. If one is damaged in service, it can be replaced in the field in 24 hours.

In Place—Wings locate from full-size attach holes at the inboard end of the spars and from hinge fittings along the trailing edge. Pivoting contour boards on each side of the wheel well stabilize the wing and check chord line location.

A set of adjustable runout bars at the forward and aft ends of the wing supports the wing contour along the leading edge spar. With the wing located vertically and all locators secured, the first operation is to trim the machined skin along the leading edge.

Limits—This 31-ft trim along the leading edge is held straight and parallel to plus or minus 0.010 in. for the entire length of the cut. Cutter depth is held to plus or minus 0.005 in. to prevent cutters from nicking or cutting into protruding spar flanges. The leading edge spar is 6 in. wide at the forward end and tapers to 2 in. at the aft end of the wing.

Power—The bridge assembly is made of a large T-shaped weldment mounted on a set of ground ways. It's driven up and down the bed of the fixture through a change gear 4 in. in diameter that meshes with a rack fastened to the bed.



Four of these air turbine cutter heads trim wing leading edges. Wheels on either side of the cutter control depth of cut

An operator mills seat around the landing gear well. Router is hand fed around the fixture

On the bridge, four air turbines drive four-fluted, high speed steel end mills, which are ½-in. in diameter, at 22,000 rpm. Each turbine can be raised or lowered with a handwheel located on the top of the bridge.

Guides—Rolls run on protruding flanges which act as followers and control depth of cut. One roll is on each side of the end mills.

These rolls are held against the spar flanges by four air cylinders, which also move the turbine assemblies in and out from the wing. Pressure regulators mounted on top of the bridge assembly allow the operator to adjust follower pressure as required.

Cycle—To start trimming the leading edge, the operator throws two switches on the control panel which start the air turbines. After the turbines have reached cutting speed, another switch actuates air cylinders that move cutters into the cuts. Then a third switch is thrown. The bridge assembly starts to climb the ways and the upper and lower skins are trimmed simultaneously.

Limit switches automatically stop the travel of the bridge assembly after the cut is completed. Runout bars keep cutters from nicking the spar when the followers pass off the wing. The bridge assembly is held at the top of the fixture until the next wing is loaded into the fixture.

Bore and Face—Alignment of the main landing gear, in relation to the center line of the airplane, is dependent on the accuracy of the boring and facing of the main landing gear trunnion points. These trunnion points must be bored and faced consistently in all wings to give the main landing gear interchangeability.

Boring and facing are done by boring head units on each side of the machine. These units consist of two box-shaped weldments. Each has a set of ground ways which allows it to move transversely and longitudinally. Mounted on top of these weldments are two boring heads which pivot up and down. The boring heads are mounted in line, pointing in opposite directions.

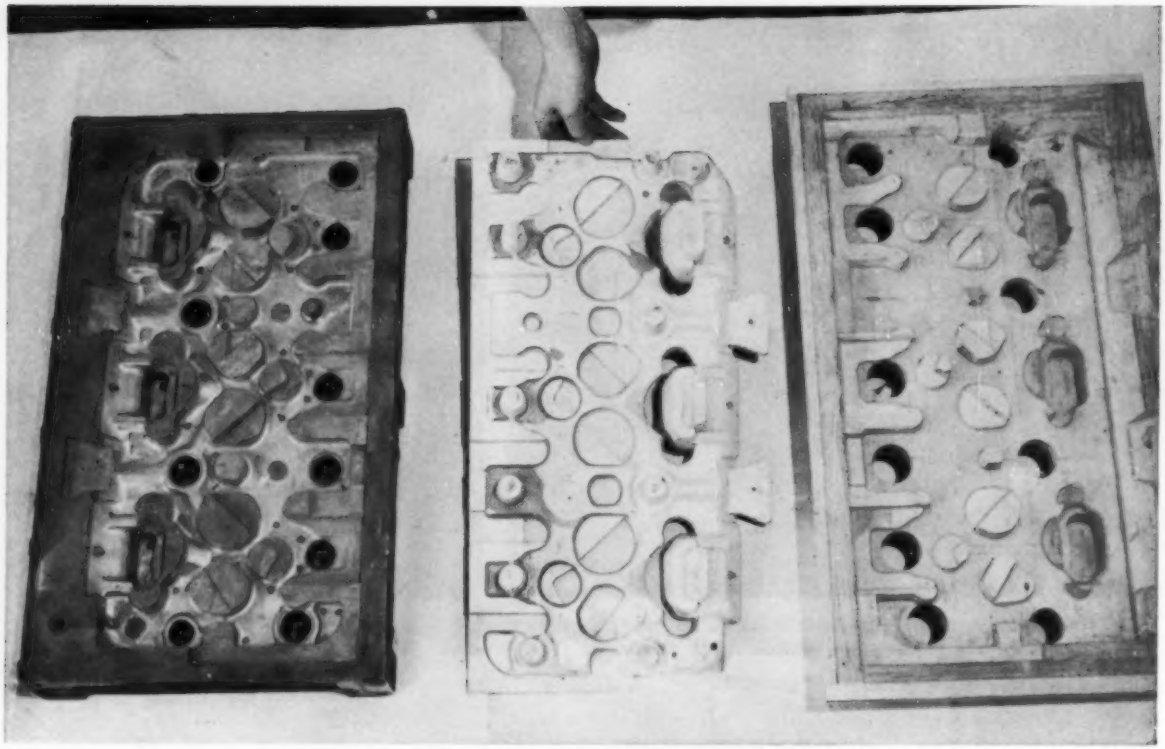
Operation—The operator lowers the boring heads, and the assembly is cranked into position and pinned through wing spars and the jig structure for location. The heads are then raised to cutting position. Boring the hole (it's 2.4351 in. in diameter) and facing the boss (it's 4¼-in. in diameter) are done in one pass with a special, one piece, carbide tipped, five-fluted cutter. Boring heads are fed into the boss by a handwheel. Cutters are run at 50 rpm.

Third Step—Because of a build-up of assembly tolerances, a clean-up cut must be made around the perimeter of the main gearwheel well to form a seat for the door. This milling operation is done with an air turbine driving a four-fluted, high speed steel cutter ⅞-in. in diameter at 22,000 rpm.

The turbine is hand operated; it's guided by a profile fixture that has flame hardened guide strips. Depth of cut is controlled by a guide bushing that runs against the outside surface of the wing, moving the cutter in or out of the collet. An air cylinder forces the cutter into the cut by applying pressure to the underside of the guide strips of the fixture.

This fixture is held to the wing by hooks that clamp around jig pins. A C-clamp holds it at the top. After the cut is finished, the fixture is removed and stored in a rack under the stairway of the machine.

After all cutting is done, the operators lift the wings out and turn them 90 degrees to normal flight position so they can move on down the production line.



Here's how plastic minimizes the cost of changes. Original drag jacket of metal (left) served as mold for plastic model (center). Rough wooden master (right) is for aluminum corebox frame

Plastic Speeds Patternmaking

Foundries can cut cost of making cope, drag and core patterns by using an epoxy. It is claimed that the material has several advantages over those which are in conventional use

IF the dimensions of a metal foundry pattern must be modified, including enlargement, epoxy resins will help you cut costs 50 per cent and save up to two-thirds the time you normally require for such changes.

It's a short cut that's gaining favor with foundrymen at International Harvester Co.'s Milwaukee plant. Here are a few examples which stimulated the enthusiasm and some techniques you can use.

Main Frame—International Harvester had to enlarge the cross section of a frame casting for its model ID-18 crawler tractor. Normally, such a pattern change costs $700 and takes three weeks.

Applying an Epon (epoxy) resin at the right location cut the cost to $300. The pattern was back in production in a week.

International Harvester saved over $2000 on this one:

A design change in a cylinder head necessitated a new drag jacket corebox. Using the original one, which cost $3500, the company made a plastic core model. The change was incorporated and a new plastic corebox was poured from the corrected model.

Obtaining a partially correct core model from the available equipment was responsible for much of the saving. If an accurate mahogany drag jacket core model had been needed, the cost would still have been less than $1900.

How To—The first step was to

Both the model and the mold standing on the table are made from an Epon, resin-glass cloth laminate. The method is saving thousands of dollars annually, says International Harvester

reproduce the core with Epon (made by Kish Industries Inc., Lansing, Mich.) milled down 1/16-in. and refilleted on all edges. This served as the model from which all the other foundry equipment was prepared.

A wood master pattern was made, which roughly followed the contour of the corrected plastic core model and formed the outside dimensions of the corebox. An aluminum pattern was cast from this master pattern.

Top and bottom of the rough aluminum frame were machined to the correct height, and the surfaces to be faced with plastic were sandblasted. At the same time, the plastic model of the drag jacket core was carefully cleaned, covered with a parting agent, and placed on a flat surface. The cast aluminum frame was inverted over the model, and hard-surfacing Epon poured into the ¼-in. space between the two. A hole drilled in the frame acted as a funnel.

Finishing—The resin hardened in 4 hours at room temperature. The model was removed and the screen, wire stools and vents were inserted into the finished corebox. Because the original corebox had been copied perfectly, its blow cover could be used on the plastic duplicate. The amount of fitting necessary on the dryer seats was negligible.

Epoxies have helped International Harvester shave months from its tooling schedule, permitting the introduction of new models ahead of target dates.

Even greater savings are possible when equipment is ordered from an experimental part. Because a shrinkage allowance is needed if the corebox is to be cast in iron or aluminum, wooden experimental patterns are of little use, except to determine partings. A new set of master patterns must be prepared.

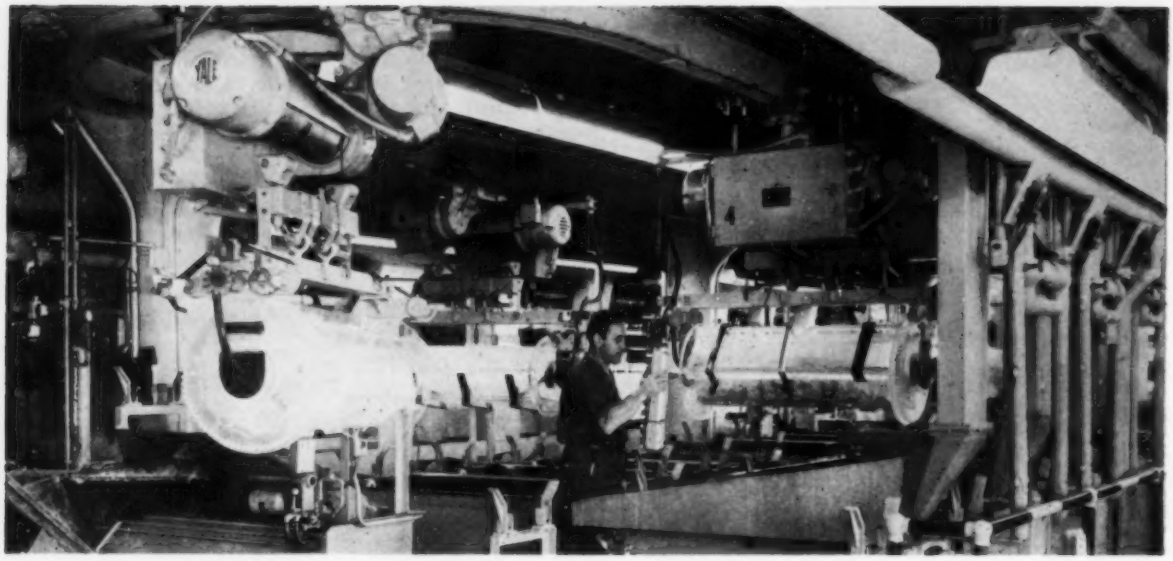
When epoxy resins are used, coreboxes and other foundry equipment may be cast against plastic models taken from the experimental pattern equipment. Shrinkage is negligible (about 0.004-in. per foot).

Wear Resistance — Coreboxes take a tremendous beating. In the Milwaukee pattern shop, sand is forced into the corebox at 120 psi. The entire corebox is filled in a matter of seconds. Although the life of a corebox varies considerably with its design, repairs are much easier with plastics.

In foundry patterns, epoxies are considerably smoother than other materials. International Harvester had a gang pattern for casting eight winch braces at one time. There was a tendency to break the mold when drawn, despite repeated paintings and surface preparation. Duplicating the pattern in epoxy eliminated the sticking problem.

The company depends on epoxy resins for many applications. In addition to design changes on metal, wood, plastic or plastic-faced equipment, it also uses the Epon formula for patterns and coreboxes, dryer master patterns, dryer fitting and drilling fixtures. Much of the equipment is giving satisfactory service on jolt machines, sand slingers and coreblower machines.

These cope and drag patterns for the oil pan of a diesel have an epoxy facing. The plastic simplifies pattern production; they can be drawn from molds with minimum danger of sticking



Automatic cycle starts with pendant control operator is holding. Gear on barrel end engages drive in tank. According to a preset cycle, barrels proceed from one tank to another without further attention

Automated Hoists Cut Plating Costs

By adding electronic controls, you can use them as the principal parts of a transfer system. Here is a description of a four-phase operation which one company is using

HOISTS that cycle themselves are the key to the automated plating line at Gillette Safety Razor Co., Boston.

The system is said to be faster, more compact and flexible than the old rack plating process, which required manual handling and lifting.

Arrangement—Plating tanks are arranged in a long oval. Six Yale & Towne electric hoists on motor driven trolleys are mounted on a closed loop track above the tanks.

The operation has four phases. In the first one, an operator, using a pendant-type controller, raises, lowers and moves the load from tank to tank. When he lowers a barrel into a tank, a limit switch actuates a remote timer.

At the end of the elapsed time (from 3 seconds to 20 minutes), a signal light and bell indicate that the load must be moved to the next operation.

Each tank has a gear which engages the barrel end to rotate the load in the solution.

Automatic—The second phase is automatic. The operator sets a selector switch on the pendant control, and the hoist raises the load until it hits the upper limit switch. The motor trolley moves over the first tank, lowers the barrel into the tank, raises it after a preset period and continues to the next tank where the cycle is repeated. Certain tanks can be by-passed.

When the load reaches the end of phase two, a bell and light signal that the cycle has been completed.

Plating stations in the third phase require the longest time, so hoists are disconnected manually, and used elsewhere until the load is ready. After plating, the operator reconnects the hoist, and pushes the "automatic" button on the pendant control. The barrel then passes through seven tanks without further attention. At the end of the line, bell and light again signal that the load is ready to be dumped and dried.

Safety—It's not possible for one hoist to catch up with another and cause a jam-up. If the station ahead is full, the hoist behind it keeps its load lowered until there is room for it to move ahead.

Between loading and unloading there is space to store two hoists with empty barrels. As soon as a barrel is unloaded, the operator merely pushes the start button and the trolley moves itself to the storage position.

BIGGEST THING EVER SHIPPED ON THE NEW HAVEN R. R.

This is one of two tanks made for a large Eastern chemical plant. The tanks are 12 feet high and 54 feet long. Each is the largest object ever carried by the New Haven.

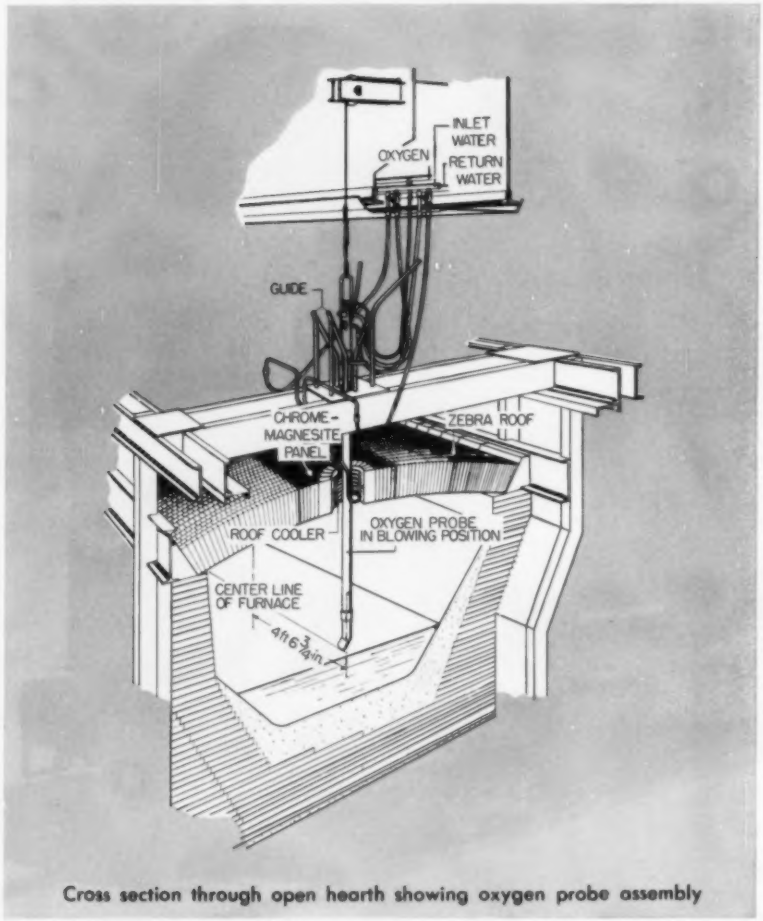
The acid storage requirements of this modern plant called for these two specially designed tanks—and U.S. Permobond® lining was chosen to properly protect them. But the immense size of the tanks set up a problem: the bridges, tunnels and overpasses on the railroad made normal routing out of the question.

Working with the railroad's traffic department, "U.S." arranged a special routing for the tanks—from the steel fabricating plant to the "U.S." plant in Providence (where the tanks were lined) and then to the site of the chemical plant. The map on the side of the tank (above) shows the route from fabricating plant to Providence.

For protection against corrosion of tanks, piping, valves—get in touch with "U.S." technicians through Mechanical Goods Division, United States Rubber, Rockefeller Center, New York 20, New York.

Mechanical Goods Division

United States Rubber



Cross section through open hearth showing oxygen probe assembly

Oxygen Through the Roof

Steel Co. of Wales has developed an oxygen jet and roof construction that produces a workable system for the open hearth. Kaiser Engineers is licensee

AN oxygen-through-the-roof process of open hearth steelmaking which has proved workable in Wales is about to cross the Atlantic under the auspices of Kaiser Engineers, Oakland, Calif.

Kaiser is licensee of the patents that Steel Co. of Wales Ltd. holds for a torch assembly and roof construction which produce a workable oxygen system for the open hearth.

Advantages—Steel Co. of Wales is using the system at its Abbey Melting Shop. A. J. Kesterton, superintendent of steel production, cites these advantages over introducing oxygen into the hearth through the back wall or charging doors:

1. The mechanism required is simpler and can be easily controlled remotely.

2. There is no large steel framework projecting over the back platform to interfere with tapping. There is no danger of damage by casting cranes.

3. The railway track in front of the furnaces is clear for the passage of scrap buggies. There is no interference when charging adjacent furnaces.

4. A water-cooled jet eliminates the manpower required to handle, control and change bare steel lances.

5. A jet through the roof can be situated over the center of the bath, so there always is a full half bath length available in which to burn the combustible gases from the oxygen reaction.

An electric winch inside the main gantry girder above the furnace raises and lowers the oxygen gun. The winch operates a wire rope passing over a series of pulleys to the gun. Pushbuttons on the furnace instrument panel control hoisting and lowering.

Guides—Near the top of the gun are two diametrically opposed steel pins which, as the gun is lowered, move into position between guides fixed to the top steel binders of the furnace. The guides are tubes 2 in. in diameter which are bent outward to form a four-pronged splay to receive the pins.

Two of the steel tubes are longer and splayed at right angles to act as a guide and gather in the hose pipes carrying the inlet and outlet water and oxygen.

When in the guides, the steel pins prevent the oxygen gun from twisting in any direction and insure that the gun fires longitudinally along the furnace.

Water-Cooled—The gun passes into the furnace through a hole in the roof which is fitted with a water-cooled steel pipe spiral. It enters the 15-in. roof to a depth of about 9 in. The water is delivered to the lowest spiral and then circulates upward at high velocity. This design of the roof cooler prevents excessive wear of the roof due to the flames passing through the hole, and has long life, says Mr. Kesterton.

Surrounding the water-cooled spiral is one ring of chrome-magnesite bricks. In the longitudinal direction of the oxygen blow, there is a panel of chrome-magnesite bricks, 5 ft 6 in. long and 4 ft 6

Let's Talk about Tools and Money

Never in history has competition for the consumer's dollar been keener than it is right now.

In the face of mounting costs, the manufacturer is under continual pressure to turn out a better product at a lower selling price. Inevitably, this problem of producing more for less is laid squarely in the lap of production.

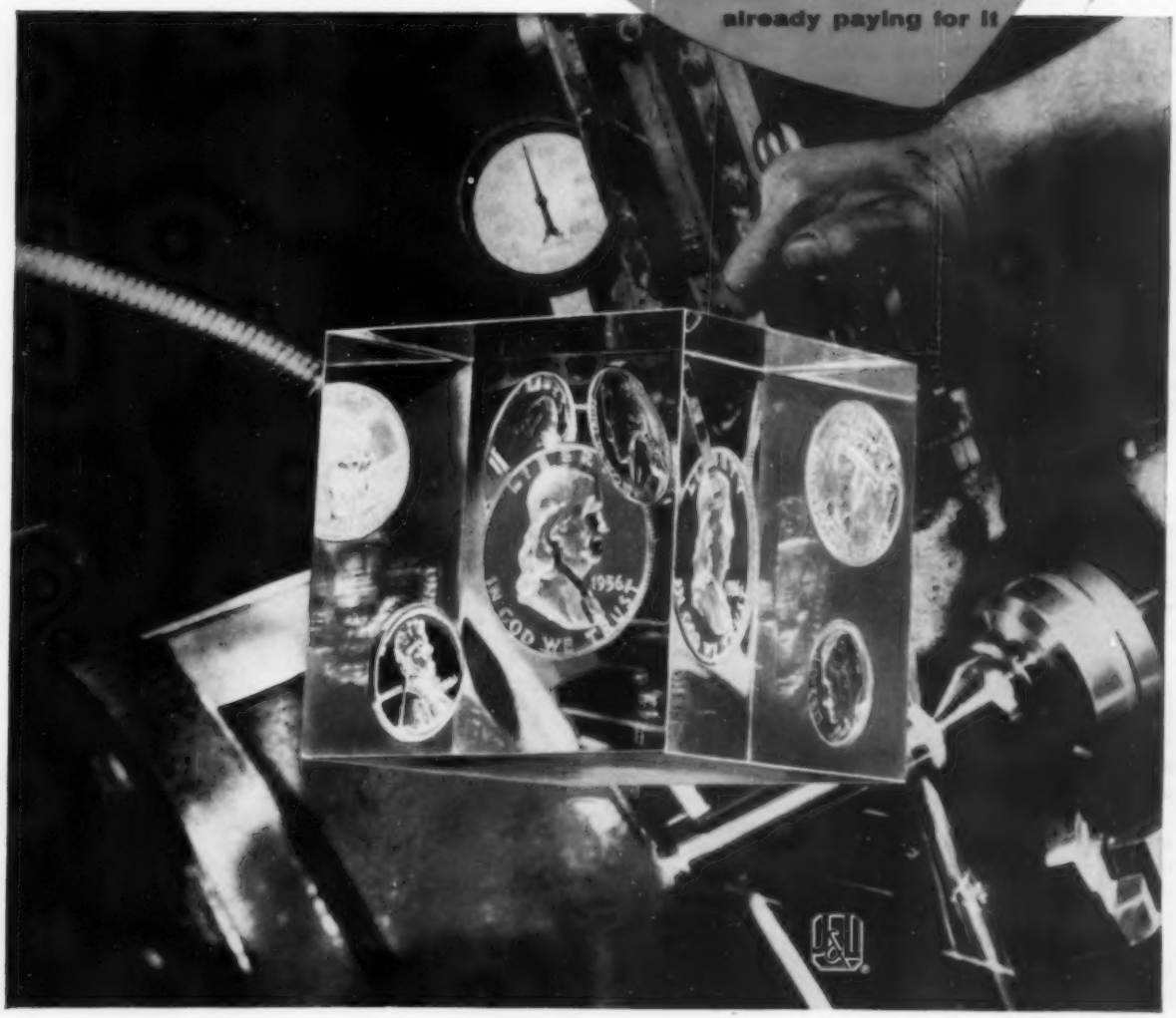
Quite obviously, when machine tool miracles are a "must", to tolerate outmoded equipment is to embrace disaster. Only the *most advanced, most efficient* machine tools can play a part in producing the marvels that *must* be wrought.

We invite you, as a member of production management, to study the following pages on which are shown representative J & L products. JONES & LAMSON MACHINE COMPANY, 517 Clinton Street, Springfield, Vermont.

JONES & LAMSON MACHINE COMPANY

the man who needs a new machine tool is already paying for it

We offer a variety of finance plans.



in. wide, which prolongs roof life in this area. It is more resistant to splashes that may reach the roof and to the effects of flame arising from the reaction zone, particularly if the oxygen is blown at high carbon.

Prevents Splashing—The lower end of the 4½-in. OD oxygen gun is bent at an angle of 25 degrees from the vertical to insure that the reaction zone is not immediately below the gun. This reduces the quantity of slag and metal splashing back around the orifice, which lengthens the life of the gun. The amount of bend in the end of the gun allows it to pass freely through the water-cooled annulus in the roof.

The lower part of the gun, the central 1-in. bore oxygen tube and the end plate, are made of copper, with copper welding.

Surrounding the oxygen tube are three symmetrically placed ¾-in. bore steel pipes which convey cooling water to the end plate. These pipes pass through a diaphragm plate at the top of the gun and receive their water from a large bore inlet pipe above the diaphragm. The return water is taken off below the diaphragm plate.

Gun Life—Average life is about 60 oxygen blows of about 40 to 50 minutes duration each. The record run without repairs is 236 blows. Failure usually is the result of chamfering of the jet orifice. Eventually, the oxygen cuts through the tube and end plate into the water jacket.

Repairs are made by copper welding, and the gun will run again for as many lives. Some have been so repaired many times. One gun, which has had five runs involving four repairs, has a total life of 298 blows to date.

Control — On the instrument panel of each furnace is an oxygen pressure gage measuring the pressure before the flow control valve, a combined oxygen flow rate indicator and a total flow integrator.

The integrator can be reset to zero before each blow, so the number of cubic feet of oxygen consumed can be read directly any time during the process.

Carbon Level—Oxygen normally is started as soon as the bath is clear melted or virtually so at any point below about 0.45 per cent carbon. Above this carbon level, the reaction may become violent, producing a good deal of flame, which, even with the oil off the furnace, may raise the roof temperature high enough to melt the silica bricks. The fume from the stack also is heavy.

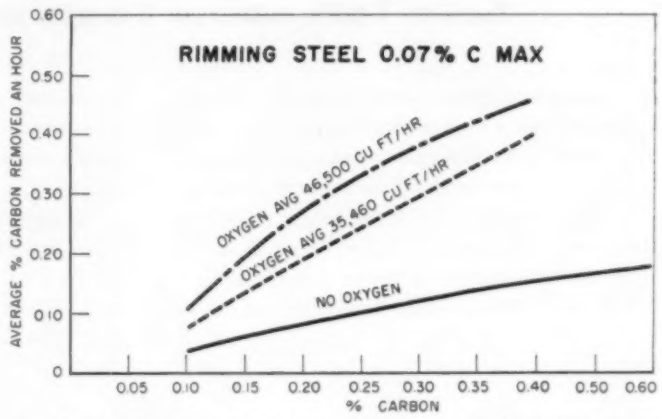


Fig. 1—Average rate of per cent carbon drop per hour for oxygen blown and normal casts

Occasionally, the oxygen may be used for a few minutes at a reduced flow at higher carbon levels to clear up the final stages of the melt or promote action in a sluggish bath.

Manageable—Below 0.35 to 0.40 per cent carbon, the whole process in the Abbey furnaces is entirely manageable, says Mr. Kesterton. Fume formation falls off rapidly, and below 0.20 per cent carbon is slight.

Splash varies mainly with the height of the jet orifice above the bath, increasing as this distance is increased above an optimum figure of about 4 in. If the jet is lifted 9 or 10 in. above the bath, a good deal of splash occurs in droplet form, which can and does reach the roof.

Flow Rate—Assuming a straight refining condition in which sulphur is not a complicating problem and the main consideration is rapid carbon removal, oxygen rates are adjusted to the highest level the bath will accept.

This may mean that if the oxygen is started at relatively high carbon, say 0.45 per cent, the flow rate will be about 40,000 cu ft an hour, so that reaction and flame may be controlled to a safe level. As the carbon drops, the oxygen flow rate will be increased to about 60,000 cu ft an hour.

Proportional—The delivery of a specific volume of oxygen proportional to the carbon content at the

Slag Analysis of 0.07% C Rimming Steel at Tapping

Type Cast	No. of Samples	CaO %	SiO_2 %	P_2O_5 %	MnO %	MgO %	Al_2O_3 %	S %	FeO %	Fe_2O_3 %	Fe %
Oxygen	51	42.92	8.22	4.65	4.38	6.24	3.14	0.23	19.71	9.81	22.11
Nonoxygen	72	41.00	7.89	4.47	4.47	6.19	2.74	0.21	22.28	10.56	24.60
Probability		0.001	0.32	0.27	0.71	0.88	0.001	0.075	<0.001	0.13	<0.001

Sets a New High in Automatic, High-Volume Production

A typical example of one Jones & Lamson approach to "automation" is this line. Here is completely automatic handling with both machine transfers and inter-machine transfers. In this line are 4 Fay automatic lathes and 1 milling and center-drilling machine. J & L machines of this type have been in use for many years in production plants throughout the world.

The simple, rugged transfers used in this line were designed, engineered and built by J & L. Control combinations are, of course, tailor-made for each individual application.

Automatic handling is also adapted to grinding operations, as shown by this J & L Model "E" Grinder (inset photo) which handles 136 steering worms per hour.

Send for Catalog No. 56. JONES & LAMSON MACHINE COMPANY, 517 Clinton Street, Springfield, Vermont.

JONES & LAMSON "AUTOMATION"

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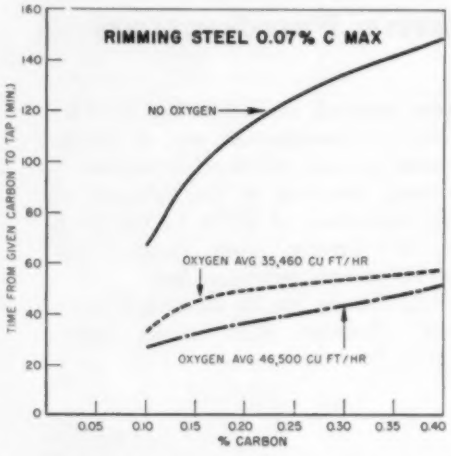

RIMMING STEEL 0.07% C MAX
NO OXYGEN
OXYGEN AVG 35,460 CU FT/HR
OXYGEN AVG 46,500 CU FT/HR
TIME FROM GIVEN CARBON TO TAP (MIN.)
% CARBON

Fig. 2—Time from given percentage of carbon to tap for oxygen blown and normal casts

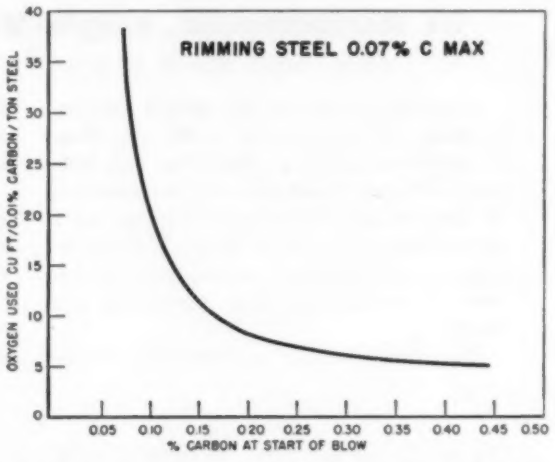


Fig. 3—Oxygen consumption in cubic feet per 0.01 per cent carbon per ton of steel from various carbons

start of the blow will reduce the carbon to that required to meet the 0.07 per cent maximum specification in the pit samples.

A sample is sent to the laboratory when the oxygen blow is started. When the carbon analysis is available, the quantity of oxygen required is calculated, and as soon as this volume has been delivered (as read directly off the integrator), the furnace is tapped without further reference to carbon analysis.

Oil Reduced—During the oxygen blow, the fuel oil input normally can be reduced. It may vary from zero to about two-thirds of that required for normal operation, depending on bath conditions. During the blow, bath temperatures are taken and serve as a guide to the oil flow required to supplement the heating effect of oxygen.

While the oil input normally is reduced during the blow, the air-fuel ratio is appreciably increased, so that the carbon monoxide generated at the reaction zone can receive sufficient air for burning as a supplementary fuel.

Carbon Elimination — The oxygen-through-the-roof process has increased the carbon elimination rate. The effect on Abbey furnaces is summarized in Fig. 1. It shows the average rate of carbon elimination in per cent an hour, calculated over the range from the bath carbon analysis at which the oxygen is started to the last bath analysis. This is about 0.06 to 0.07 per cent for normal heats and 0.05 to 0.06 per cent for oxygen blown heats.

Fig. 2 shows the refining time required from a given carbon to tapping for both nonoxygen and oxygen blown casts. Fig. 3 shows the specific consumption of oxygen in cubic feet per 0.01 per cent carbon per ton of steel, plotted against the per cent carbon at the start of the blow.

Compromise — Interpretation of these curves suggests that the higher the carbon content at which oxygen blowing is started, the greater is the net gain. This is counterbalanced by the fact that above 0.45 per cent carbon, the reaction is too violent. Accordingly, about 0.40 carbon has been selected as the best compromise at which to start the oxygen blow.

The table on page 114 compares the average tapping slag analysis for 51 oxygen blown casts and 72 nonoxygen casts. The probability that the difference between the various analyses is not significant is given below each slag constituent. It is clear that the differences shown for CaO, Fe, FeO and Al_2O_3 have only one chance in a thousand of being random.

Fe in Slag—There is a useful significant difference in the iron oxide concentration favorable to the oxygen blown casts. Expressed as Fe, this constituent is about 2.5 per cent less for the oxygen casts. Also significantly different (and probably connected with the slag-Fe being lower), the CaO is higher by 1.92 per cent in the oxygen casts.

The oxygen casts work with a slag lower in iron oxide, but higher in CaO, to produce the same carbon specification in the steel. If other things are equal, the iron loss in the slag will be reduced, and the steel yield slightly increased.

Fettling—There is good indication of a reduction in fettling time resulting from the use of oxygen. This undoubtedly arises from the shorter refining times during which the hearth refractories are exposed to the most severe conditions of temperature and high iron oxide concentration in the slag.

Also, the oxygen jet generates heat directly in the bath itself, which, together with the lower fuel inputs, appear to give lower slag temperatures.

• *An extra copy of this article is available until supply is exhausted. Write Editorial Service, STEEL, Penton Bldg., Cleveland 13, O.*

The ONLY Turret Lathe with a fully automatic thread-chasing cycle!

Here is full turret lathe versatility and a threading attachment with a fully automatic cycle — all in one machine. Now you can be sure of concentricity of threading with other lathe work, *all done in one chucking*, with the time saving of the Auto-Threader! Nowhere else in the world can this be found on a turret lathe.

This Auto-Threader will chase straight or taper threads — or a combination — internal or external, from the front of the machine.

Concerning this J&L development, a customer writes: "We are tripling production on many of our items."

Write for descriptive folder No. 5440. JONES & LAMSON MACHINE COMPANY, 517 Clinton Street, Springfield, Vermont.

JONES & LAMSON
TURRET LATHES

Turret Lathes • Fay Automatic Lathes • Milling & Centering Machines • Optical Comparators • Thread Tools Thread & Form Grinders

the man who needs a new machine tool is already paying for it

Auto Makers Still Buying

Fewer big orders for special machine tools are coming in, but over-all volume is still high. Builders also are encouraged by the number of new customers they are winning

RUMORS about a slump in machine tool business this year persist. (See STEEL, Feb. 4, p. 59.) Builders still say it isn't so.

You hear a lot of reports that the automotive industry has substantially braked its buying programs. They are misleading.

Builders of special machines, who still count auto plants as their bread and butter, point out that spectacular expansion programs aren't in the works—this, they feel, is the basis for conversation about a lack of orders from auto makers. But, they quickly explain, many orders for one machine or for a single line continue to come in.

Ralph E. Cross, executive vice president, Cross Co., Detroit, adds: Other industries are becoming customers for special machines. He cites the aircraft and road building equipment industries as two notable examples.

Short Cut

An auto maker will use a ball-joint socket that needs no finish machining. The secret: The socket will be lined with a pad which is woven from Teflon and glass. The ball will be precision machined, then honed. After that, it will be put in the socket, and the two mating parts will be "worn in" under heat and pressure.

Other advantages: Teflon is its own lubricant; no other is required. A perfect fit between ball and socket is assured; no dust or other contaminant can get in.

Shipments Boosted

Planners at Brown & Sharpe Mfg. Co., Providence, R. I., use a 600-ft conveyor belt to expedite orders of small tools and gages. Winding its way past racks and bins, it carries the orders to the shipping department. J. E. Kochhan, B&S director of systems and audits, says that operators now can get out 1200 orders a day. That's three or four times the former shipping rate.

Wheel Standards

Grinding wheel users got an assist when the American Standards Association approved a revised edition of the 1947 safety code. The code is published in a 74-page booklet, "The Use, Care and Protection of Abrasive Wheels."

The book is a complete guide for the abrasive wheel customer. It gives complete instructions on how wheels should be handled, stored and inspected; it details machine requirements such as rigidity, power and spindle design; gives detailed instructions on guard and flange design; and tells how wheels should be mounted.

A four-page section and a dozen tables give top speeds at which all wheels can be operated safely.

New Items—Sponsored jointly by the International Association of Governmental Labor Officials and the Grinding Wheel Institute, the revised code gives information on some items not included in the earlier edition. They include: The revolving cup guard used on portable grinding machines, depressed center wheels, reinforced wheels and drawn steel guards for portable grinders.

The biggest change is in format. The book uses a two-column system. The left-hand column gives the code regulations. The right-hand column contains information that can help put the code to work.

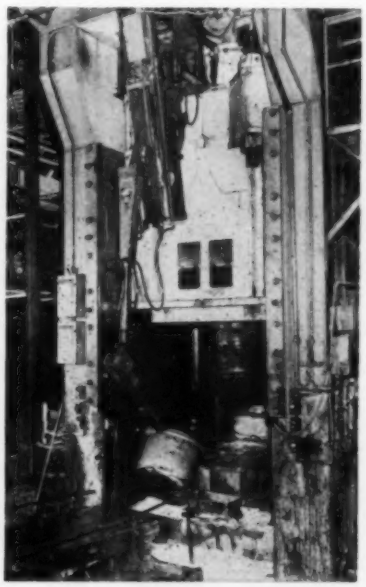
Grip Cuts Hazards

Automatic unloader replaces a workman. Self-powered, it can handle up to 42 parts a minute

THE iron hand in the picture below lifts washer baskets from a draw die and places them on a conveyor automatically.

The device has lowered costs by replacing a workman and has improved safety conditions.

Deep Draw — The unloader is mounted on an 1850-ton hydraulic press at Whirlpool-Seeger Corp., Clyde, O., which draws the 18-gage steel baskets. They weigh about 30 lb, are 21 in. in diameter, 16 in. deep.



IRON HAND
. . . unloads washer baskets

After baskets are drawn, the hand grips them by the flange, swings them off the die and out of the press onto a conveyor. Unloading speeds can be as much as 200 an hour.

The mechanism is synchronized with the press operation by a rotary limit switch. An independent air system provides the power.

Standard — Such unloaders are standard equipment in many automotive factories. Some models operate efficiently at press speeds up to 42 strokes a minute. They are made by Sahlin Engineering Co., Birmingham, Mich.

Speedy, Accurate Inspection at a Glance!

Jones & Lamson Optical Comparators are unexcelled for toolroom, laboratory and production-line inspection and measurement work. They precisely measure height, depth, lead or spacing, as well as angles to degrees and minutes. By comparing intricately contoured parts with a master outline, they measure the amount of error. J & L Comparators are versatile and flexible — perform a variety of inspecting and measuring functions. Moreover, they are convenient to operate, easy to set up, and read direct without computation.

In regard to this typical application, shown below, Modern Corporation, Detroit, says "Modern Corporation's 30-inch J & L Comparator has become the key instrument in the inspection of fine MODCO tools . . . protects quality prestige . . . customers' rejections kept very low . . . saves $3 to $5 per hour when used on large tools."

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JONES & LAMSON
COMPARATORS

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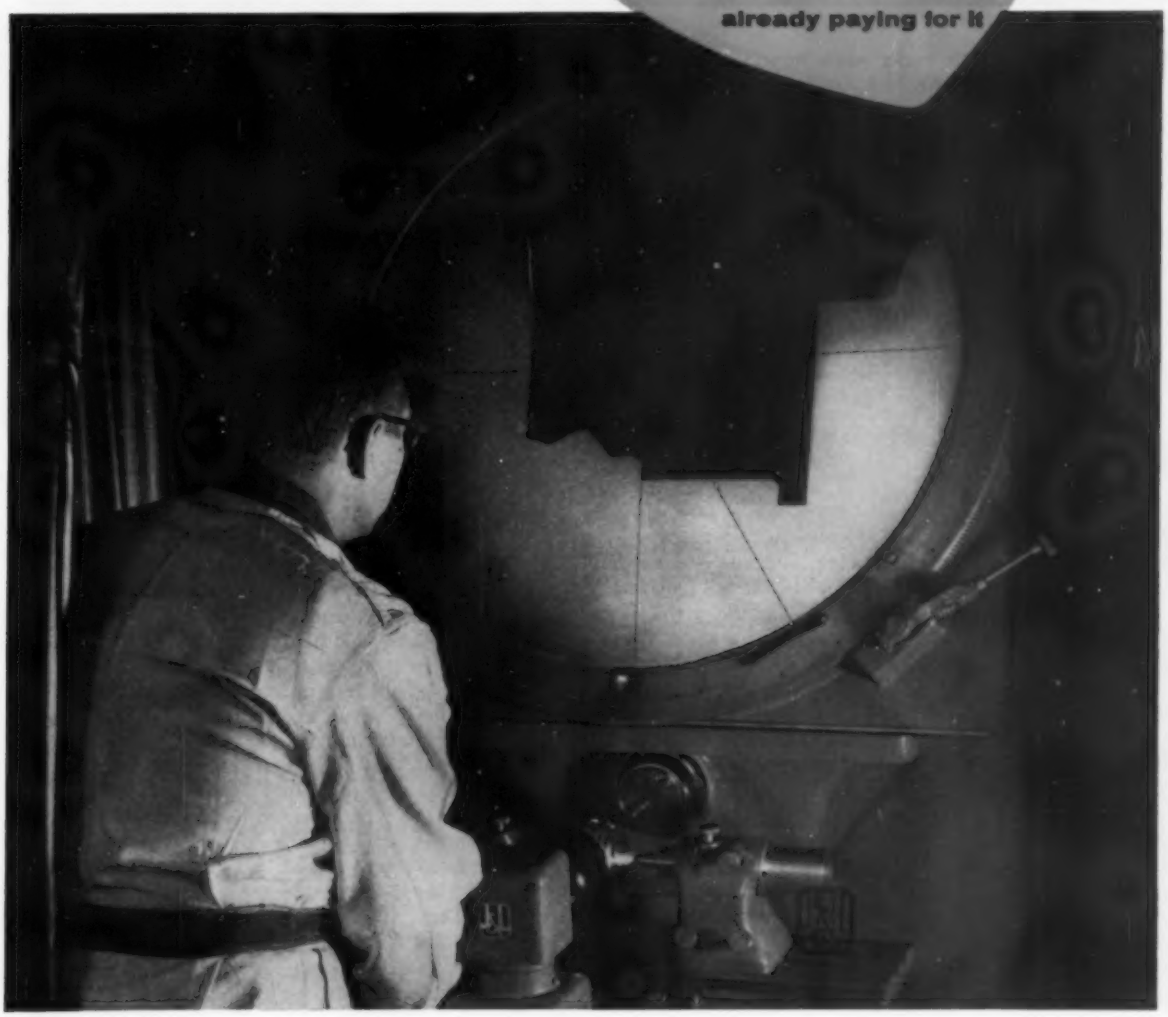


Two Oster portable lift trucks easily handle the master tools for the wing leading edge of North American's FJ-4

Here's a Job for Hand Trucks

Mechanical handling in narrow, hard-to-reach aisles is a natural for these units. Shows that putting right tool in workman's hands can mean substantial increases in production

ALMOST every plant has some aisles that are too narrow for fork lift trucks.

Tote boxes, trays and homemade dollies are attempts to solve the problem.

North American Aviation's Columbus, O., plant, solved the problem with Oster portable lifts. Each can be easily operated by one man, will lift 2000 lb.

Low Cost—Small, portable lifts are an economical solution. The aviation firm indicates that they require practically no maintenance.

Here's how they are used:

In the detail tooling department, machine tool fixtures are produced from steel, aluminum and several other metals. Incoming raw material is carried by a portable lift to a band saw for rough cutting, then to a planer, then to storage or production. Six lifts do all the work needed in the department.

In the layout and template department, one lift moves heavy master models. Since there is not enough volume, a large, power fork lift isn't justified.

Checking—In the shop contact department, liaison engineers work between final assembly and the manufacturing departments. They often move heavy subassemblies, parts or tooling from the assembly line to a tooling plate for checking. The Oster lift easily positions the work.

At final flight test, parts are often removed for further checking. Small lifts are available at the flight line at all times. Heavier fork trucks move the parts when it's convenient.

Tools—Harold A. Minder, senior manufacturing engineer for North American, says that it is the company's policy to provide all employees with the best tools. "Portable lifts help a man use his ability and skill where it's needed. They minimize the time wasted on semi or nonskilled labor," he explains.

Lifts not in use are always stationed at a designated location within each department. The policy is strictly enforced to reduce time lost in locating them.

North American feels that its short, interdepartmental handling is just as important to economy as its policy for handling longer hauls.

Gives Versatility . . .
Fast Change-over . . . Micro-Size Control

Typical of J&L thread tool products is the MC Collapsible Tap (illustrated here) for use on either stationary or rotating jobs. This one complete tap, plus parts, gives five sizes of taps ranging from 1 5/16" to 3 1/2".

Jones & Lamson's recent purchase of the Modern Tool Works, Rochester, N. Y. greatly broadens J&L's service in the thread tool field. Now, from the operators of the world's most modern thread tool plant, you can get complete lines: die heads and chasers; accessories and sharpening equipment; plus a line of collapsible taps and chasers, solid adjustable taps and chasers, the Modern-Magic Chuck, and the Modern Stud Setter. Complete engineering service is available for the entire line of products.

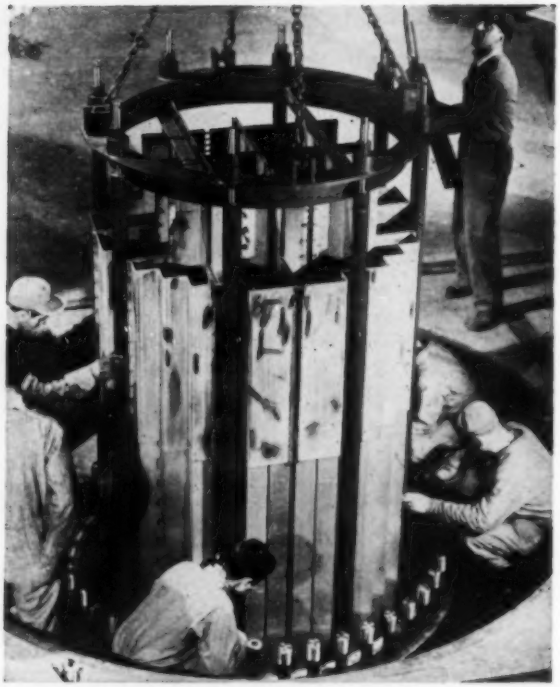
Send for Thread Tool Catalog. JONES & LAMSON MACHINE COMPANY, 517 Clinton Street, Springfield, Vermont.

JONES & LAMSON
THREAD TOOLS

Turret Lathes • Fay Automatic Lathes • Milling & Centering Machines • Optical Comparators • Thread Tools Thread & Form Grinders

the man who needs a new machine tool is already paying for it

The nation's first power generating station using a nuclear reactor is in operation. It can provide 5000 kw—enough for a town of 7500



Reactor core assembly is lowered into place

Nuclear Powered Generating Begins

POWER generation with nuclear fuels has started. On Feb. 9, Argonne National Laboratory, near Chicago, put into full operation the first experimental boiling water reactor power station in the U.S.

It is a direct cycle, 20,000 kw (heat) reactor, which provides for the generation of 5000 kw of electricity—power enough to supply the average needs of a town of 7500. The station will supply the power needs of Argonne's 2600-man laboratory.

Power Plant—The three major segments of the power plant are: 1. The steel pressure vessel which contains the fuel elements, control rods and pure water. 2. The turbine-generator and condenser. 3. The huge steel shell which houses the power plant.

Babcock & Wilcox Co., Alliance, O., fabricated the reactor pressure vessel from SA 212, grade B, firebox quality steel with a B&W spot-welded stainless cladding. Submerged arc welding was used.

Radiation damage and high thermal stress in the vessel walls, resulting from the high gamma radiation flux, are held within acceptable limits by use of a 1 in. thick shield of stainless with high boron content.

Reactor Operation—The reactor operates from zirconium-clad uranium fuel elements. The fissioning of uranium atoms releases heat which converts part of the water in the core to steam. The steam, at 600 psi gage pressure, is fed into the turbine-generator.

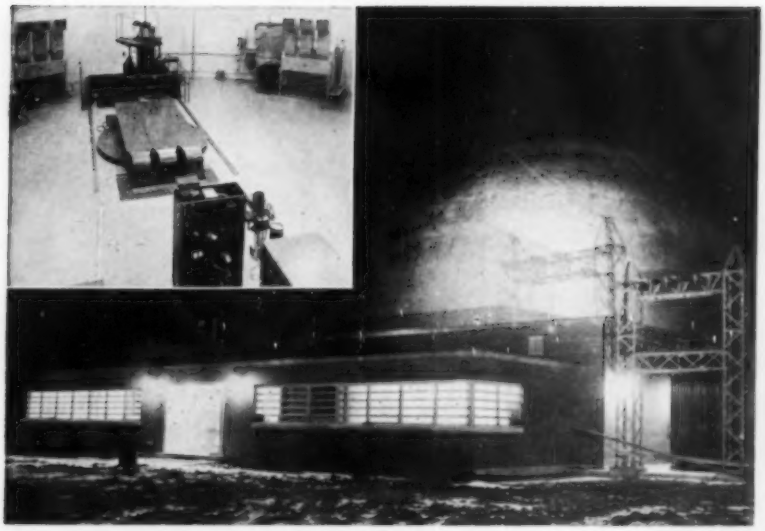
A direct connection between the reactor and the turbine eliminates the need for heat exchangers. Both turbine and reactor operate at the same steam pressure.

Spent steam goes into a condenser, becomes water and returns to the reactor pressure vessel. Cooling water circulates through the reactor core by natural convection; no pumps are used.

Turbine—The turbine-generator and condenser unit were built by Allis-Chalmers Mfg. Co., Milwaukee. The turbine differs only slightly from conventional units. Its design is modified to make it markedly leakproof against steam.

Grooves on the lower surface and special glands on the upper casing (see photo) are evacuated continuously. The outer groove carries dry air under pressure. Any outward steam leakage is evacuated and can be reclaimed; any in-leakage will contain no airborne moisture.

Condenser—Aluminum tubing is used in the 5300 sq-ft condenser. Tubes are fitted with 26-gage stainless snap-on erosion guards. The condenser has two compartments; either can be used, but normally both are used. The shell of the condenser is A285 steel, rub-



Huge steel shell houses the power plant. Inset shows interior of shell; reactor is covered by steel plate and yoke

Diffuser and nozzle head assembly of pump is lowered into tank

ber lined for extra protection.

Pumps for the system are two 4 x 2 in., eight-stage centrifugal units. To eliminate shaft seals where possible, the usual condensate pump is built into the first stage of the feed water pump.

Both inner and outer pump casings and nozzle head are 4 to 6 per cent chrome steel. Shaft, impellers, diffuser rings and the balance shaft are 12 to 14 per cent chrome steel.

Steel Shell—Housing the reactor unit is a steel ellipsoidal shell, 80 ft in diameter and 119 ft high. It was fabricated by Graver Tank & Mfg. Co. Inc., East Chicago, Ind. Steel used in the all-welded shell is A300 and A200.

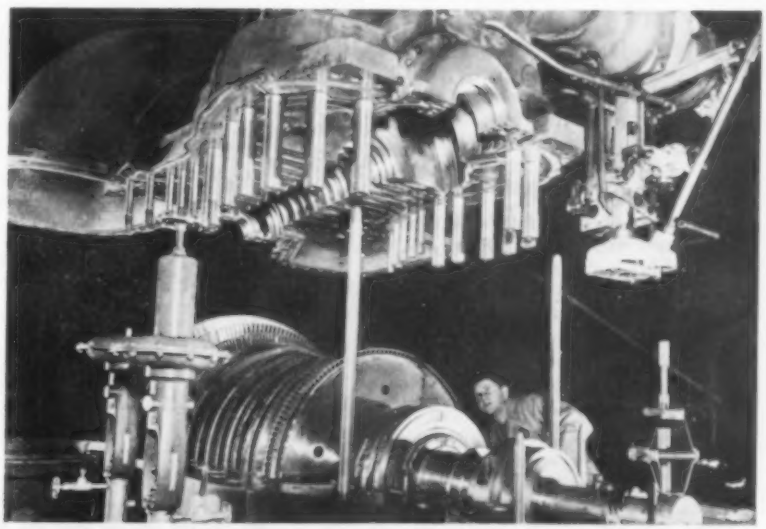
When the reactor is operating, the shell must be airtight. Specifications call for the shell to withstand an internal pressure of 15 psi. Plates in the structure, ranging from 5/16-in. to 1 in., were shaped and formed at Graver's plant. Erection was at the plant site; automatic welding was used where possible.

Testing—The shell, half of which is below ground surface, presented a unique problem in testing. All welds were given soap bubble tests for air tightness during fabrication. In the final pressure test, equipment has to be devised to compensate for the effect of changes in barometric pressure, wind, rain, humidity, sun, daylight and darkness so a constant pressure could be maintained. In making the test, internal shell pressure was raised to 18 psi, then lowered to 15 psi where it was held for 11 days.

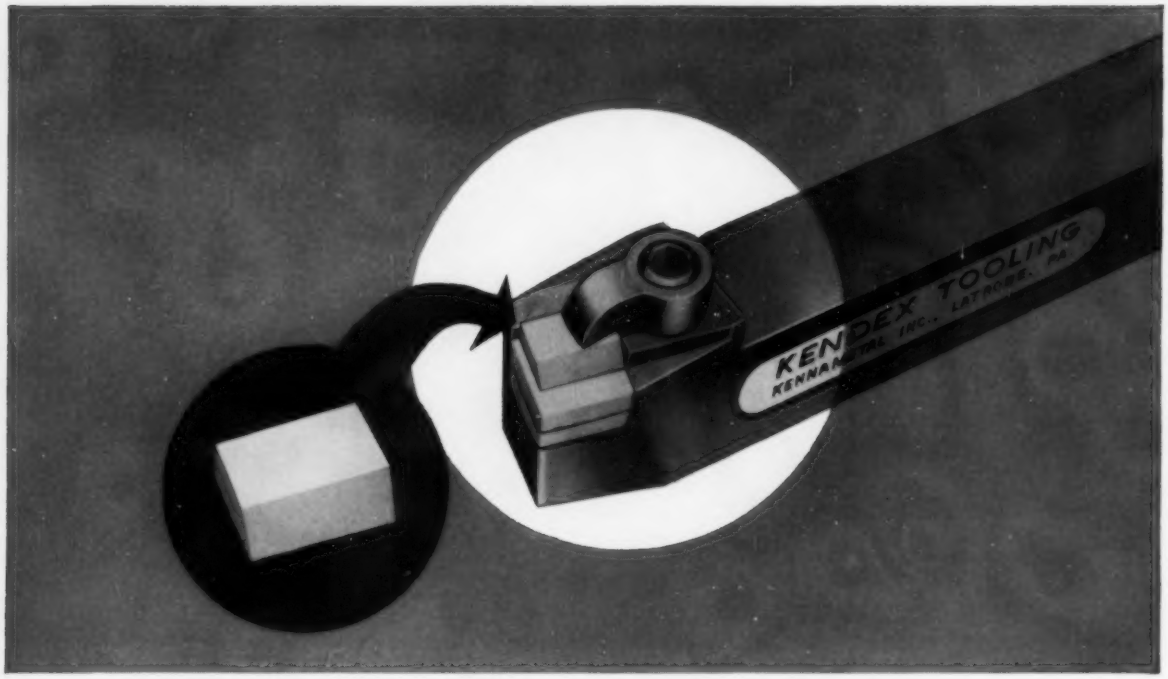
The structure gives complete protection against the escape of radioactivity to the atmosphere if the system is damaged. The reactor is suspended from a huge steel frame and is elastically mounted. A steel plate and yoke cover the reactor and, with the steel and concrete shields on the sides, will direct all forces downward in the unlikely event the reactor vessel should rupture.

Control—All equipment is designed for remote control from the adjacent control and service building and is equipped to prevent the escape of radioactive water or contaminated material.

Argonne officials say the boiling water reactor is especially significant in the AEC's power program because of its simplicity of design and inherent safety characteristics.



Turbine is driven by 600 psi steam. Note grooves on lower surface and special glands on upper casing to prevent steam leaks



You get uniform chip control with KENNAMETAL* Chipbreaker Plates

More pieces per shift... reduced tool cost... high precision machining

One of the important features of Kendex* Tooling is the uniform chip control that Kendex Chipbreaker Plates provide. Here are some of the advantages:

1. Chipbreaker Grinding Eliminated—costly grinding of chipbreakers ordinarily represents 60-70% of total regrinding costs where chipbreakers are required. Kendex Tooling eliminates all grinding, including that of chipbreakers.

2. Uniform Chip Control—provided over a wide range of feeds and speeds without any adjustments being required. This is vital to critical work. Ground-in chipbreakers tend to become too deep and too narrow after several regrinds. Each tool presents an individual problem that depends on the skill of the tool grinder and the condition of the grinding wheel.

3. Fewer Insert Failures—On jobs with heavy feed rates, Kendex Chipbreaker Plates greatly reduce pressures on the insert. The pressure required to curl chips is absorbed by the chipbreaker plate instead of the insert.

4. Easily Modified—Kendex Chipbreaker Plates are easily modified for unusual chip curling or breaking requirements. Furthermore, once the proper requirements are established, the plates remain constant. This eliminates the expense of continued, costly experimenting. If necessary, the chipbreaker plate can be removed and replaced without disassembling the Kendex tool holder and with no time lost in resetting the tool.

5. Complete line of Chipbreakers for Kendex tools available in two types: (a) for general purpose machining, and (b) for light feeds.

Your Kennametal tool engineer will gladly help you select the proper Kendex tool and Chipbreaker Plate for each job requirement. Call him or write to KENNAMETAL INC., Latrobe, Pa.

AVAILABLE NOW... A KENDEX CHIPBREAKER PLATE FOR EACH KENDEX TOOL

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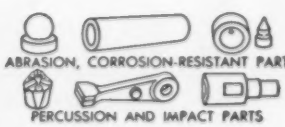


Precision Borer Holds Work to Plus or Minus 0.0003 In.

Model C-4 Hydro-Borer can be built into production setups and mounted on any type base.

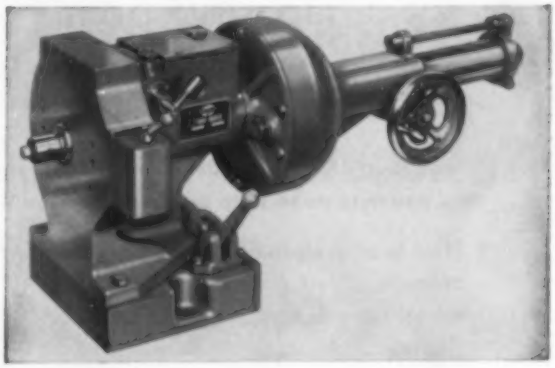
Fixtures can be mounted directly on the face, 90 degrees to the spindle.

The spindle diameter is 1¼-in., with a No. 2 Morse taper. A concentric or eccentric taper can be supplied.

The eccentric taper permits the bore diameter to be increased 0.014 in. in increments of 0.001 in. without resetting the tool bit.

Oil displacement provides positive feed. There are two ranges: 0.002 to 0.004 in. or 0.0035 to 0.007 in.

The borer feeds in either direction by reversing rotation. *Write*: Greenlee Bros. & Co., Rockford, Ill. *Phone*: 3-4881



Waterproof Cover Protects Cold-Rolled Steel

This cover for railroad freight cars makes it unnecessary for shippers to shroud cold-rolled steel while it is in transit.

The 1350-lb cover is made entirely of steel. It is vented to prevent condensation.

The covers can be lifted off cars easily by using a crane.

Design of the covers permits them to be stacked or nested, one on top of another, without danger of damage.

Strength: A 600-lb weight placed on each end of a cover supported on a hook deflects the cover's bottom rail only ¼-in. *Write*: Parish Pressed Steel Division, Dana Corp., Robeson & Weiser St., Reading, Pa. *Phone*: 3-4211

Electronic System Automates Electrostatic Gas Cleaning

Automatic feedback control of high voltage inputs to precipitator installations is said to offer these advantages: Compared with manual control, it is less complex, more efficient and more economical.

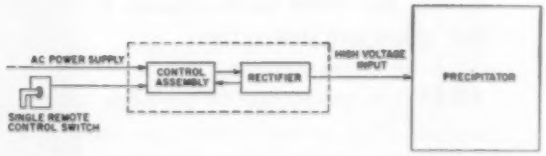
Manual and visual electrical controls are replaced by continuously acting feedback servocircuits.

The precipitator is placed in operation by a single start-stop switch for all rectifiers. These electronic circuits, one for each electric set, maintain rectifier output at an optimum level.

The control system continuously monitors and readjusts the spark rate to maintain optimum voltage and power input.

Optimum voltage and power input vary with changing precipitator conditions, such as the temperature, flow rate, composition and humidity of the gas being treated; and the size and resistivity of the particles being removed.

Operation: Automation circuits in the electrical control assembly maintain voltage output at a preset point of optimum performance, regardless of changing process or precipitator conditions.



This is done by a feedback loop that compares actual current, voltage and sparking conditions in the precipitator with ideal, preset reference levels determined by experimentation with both the precipitator and process.

The control assembly determines the proper rectifier output to give the electric power suited to conditions in the precipitator. *Write*: Research-Cottrell Inc., Bound Brook, N. J. *Phone*: Elliot 6-2600

Do you need better ways to strip paint?

When tough finishes resist your present stripping methods, you may need help on some of these problems:

1 How to strip oil-base paints . . . synthetic enamels . . . alkali-resistant plastics . . . resin-base paints . . . japans . . . wrinkle finishes . . . nitrocellulose lacquers . . . alkyds . . . phenolics . . . ureas.

2 How to strip zinc chromate primers without etching aluminum.

3 How to strip paint from vertical surfaces and undersurfaces where thin-bodied strippers run off without doing their work.

4 How to strip metal parts that are too large to be soaked in tanks.

5 How to strip paint, pigment residues, phosphate coatings and rust in one operation.

6 How to strip paint from rejects, conveyor chains, racks and hooks in continuous operation.

Oakite has more than a dozen fine stripping materials for these and similar jobs.

FREE For information on problems 1, 2, 3 and 4 ask for a copy of "How to STRIP PAINT". For more on problems 5 and 6 ask for "Here's the best shortcut in the field of organic finishing". Write to Oakite Products, Inc., 34E Rector St., New York 6, N. Y.

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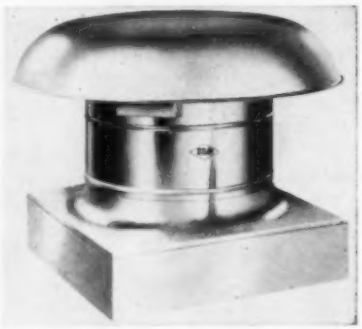
Export Division Cable Address: Oakite

Technical Service Representatives in Principal Cities of U. S. and Canada

NEW PRODUCTS and equipment

Power Roof Ventilators

Type SRQ ventilators can be used to supply fresh air to overcome inadequate ventilation or a negative head of interior air pressure due to high volume exhausting.



There are five sizes with capacities from 1310 to 11,800 cfm. Fan wheels are balanced statically and dynamically. *Write*: Ilg Electric Ventilating Co., 2850 N. Pulaski Rd., Chicago 41, Ill. *Phone*: Kildare 5-1520

Phosphating Compound

CrysCoat No. 47 is a cleaning compound which imparts an 80 to 120-milligram iron phosphate coating to iron or steel.

The coating, under standard finishes, has withstood more than 600 hours of salt spray testing. The compound also can be used for cleaning aluminum, zinc and brass. *Write*: Oakite Products Inc., 134E Rector St., New York 6, N. Y. *Phone*: Whitehall 3-0940

Fork Trucks

Models 730 and 830 have capacities of 7000 and 8000 lb. The lifts tilt 4 degrees forward and 10 degrees backward.

Battery compartments will hold

up to 18 cells of 29-plate lead-acid battery, 30 cells of MC-10 nickel alkaline battery or a gas-electric unit.

Travel speeds of both models are 5½ to 6 mph at no load and 4½ to 5 mph at full load. *Write*: Mercury Mfg. Co., 4044 S. Halsted St., Chicago 9, Ill. *Phone*: Yards 7-2515

Industrial Tractor

Model GLT Dynamotive tractor uses the high-torque drive principle of railroad switch engines.

The power train consists of a generator coupled to a Continental gasoline engine. The generator powers a high torque electric motor which is direct-coupled to the differential pinion.

The truck's electric motor is used for braking. This increases brake life and provides better control on grades.

Drawbar pull is 600 lb normal, 2000 lb ultimate. *Write*: Automatic Transportation Co., Division of Yale & Towne Mfg. Co., Chicago 20, Ill. *Phone*: Radcliffe 3-7000

Cleaning Solvents

Freon selective solvents are nonflammable materials that will remove oil, grease and dirt by immersion or vapor methods without harming metal parts or electrical insulation.

They are safe for usual work areas with conventional ventilating equipment.

Freon MF has a boiling point of 75°F; Freon BF, 199°F, and Freon TF, 118°F. They can be added to other, more dangerous solvents to decrease their flammability or to

what's so special about precision?

To this little fellow building the 1956 "dream car", precision is a bent nail or a split board. To modern automotive engines and aircraft power plants, PRECISION is a most important element.

That is why CHANDLER specialists are working harder than ever to supply cap screws to closer tolerances to meet your new requirements. Chandler is producing the finest fasteners today in all of its 25 years of experience. Chandler is specializing in mass production of bolts from high alloy steels . . . with special heads or threads . . . with drilled heads or shanks . . . ground to close tolerances . . . and with threads rolled after heat treating.

There is a Chandler cold wrought fastener to meet your specifications. And remember, at Chandler . . . there is nothing special about PRECISION because we do it every day.

6052-CH

Write today for Bulletin 1264-CH

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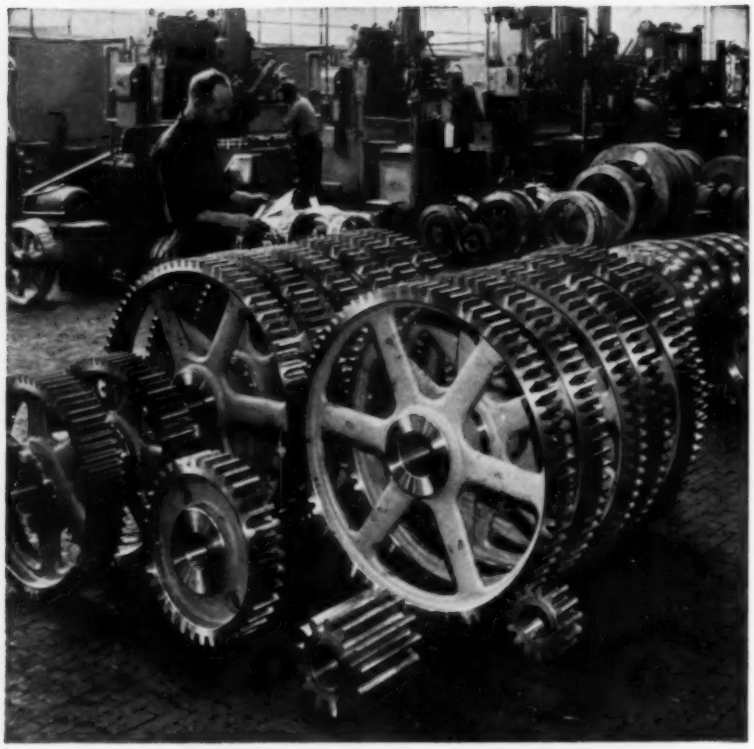

DESTINATION -Soaking Pits

These H&S steel spur gears will soon be lifting soaking pit covers for a leading steel producer. (We cut spur gears up to 144" outside diameter and 1 D.P.)

Similar large H&S custom-built spur gears have proved their dependability by serving Industry for over 50 years. Rugged construction and exact machining of all H&S gears assure quiet operation, uniform velocity ratio and freedom from vibration.

Let our years of experience in the engineering and manufacture of all types of gears be your assurance of an unbiased recommendation for the best solution to your requirements. Contact your H&S representative or send us your power transmission inquiries today.

THE HORSBURGH & SCOTT CO.
GEARS AND SPEED REDUCERS
5112 Hamilton Avenue
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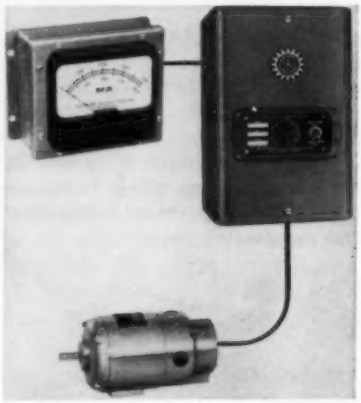
NEW PRODUCTS and equipment

change their solvency or boiling points. *Write*: E. I. du Pont de Nemours & Co. Inc., Wilmington. Del. *Phone*: Olympia 4-5121

Speed Sensor Relay

Speed can be used as a controlling quantity by the MEK-2060 relay.

Processing or testing cycles can be automatically started after a preset speed has been reached. The relay also can be used as an underspeed or overspeed limit.



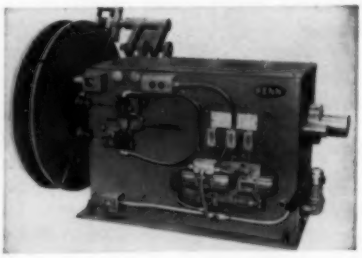
Accuracy of repeat operation is better than ±2 per cent. *Write*: Machinery Electrification Inc., 35 Hudson St., Northboro, Mass. *Phone*: 461

Take-Up Reel

Model 2310 is a traversing hydraulic reel used in combination with wire flattening mills.

The reel has a 3 in. diameter spindle and a 10 in. stroke (including any combination of traverse and adjustment across the roll face which adds up to 10 in.).

Up to 2000 lb of stock can be coiled on the reel; maximum permissible stock tension is 300 lb.



NEW PRODUCTS and equipment

The reel can mount a drum with a 16 in. ID, 36 in. OD and a face of 9 in. *Write*: Fenn Mfg. Co., Fenn Rd., Newington, Conn. *Phone*: Mohawk 6-2471

Paper Towels

The UHA 151 is a C-fold towel with high moisture absorbency.

A contoured surface made by an embossing process provides nearly 50 per cent more surface area than conventional paper towels of the same size.

Chemicals added to the paper pulp during processing give the towel wet strength. *Write*: Scott Paper Co., Chester, Pa. *Phone*: Chester 4-4211

Flatbed Truck

A three element torque converter drive is used in this 1½-ton capacity truck. Top speed is 12 mph.

Beds can be furnished to specifications. Two sizes are available from stock, 42 x 42 in. and 42 x 60 in.

An 18-cu-ft bulk handling bed can be interchanged quickly with the flat bed. *Write*: Prime-Mover Co., Muscatine, Iowa

Pump Seal

The BA12A-10 is a self-contained, compact seal for jet water pumps, oil pumps, reduction units and appliances such as washing machines.

It can be used on any rotating shaft to seal liquids which will not attack Buna-N or brass parts.

The face of the seal is made of

Numerical Control

A NEW APPROACH TO PRECISION IN PRODUCTION MANUFACTURING – "Numerical Control" is an automatic, ultra-precision means of translating blueprint data into machine positions and, other functions. Successfully applied to Pratt & Whitney high precision Jig Borers, Hole Grinders and Rotary Tables which are usually restricted to toolroom use, Numerical Control makes the superior accuracy of this equipment available for efficient long run or short run production work where extreme precision is essential. It provides automatic operation *without* complex, expensive tooling or investment in special "one-job" machines. Scrap losses due to human error are practically eliminated since the machine can be placed under the control of a tape program.

Write for more information.
Pratt & Whitney Company, Incorporated,
13 Charter Oak Blvd., West Hartford, Conn.

JIG BORERS • ROTARY TABLES • KELLER MACHINES • TOOLROOM LATHES • VERTICAL SHAPERS • CUTTER AND RADIUS GRINDERS

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FIRST CHOICE FOR ACCURACY
MACHINE TOOLS • GAGES • CUTTING TOOLS

filled true carbon to prevent porosity. It withstands high face loading and heat.

The seal is recommended to operate against pressures up to 100 psi and is available for shafts ⅝ and ¾-in. in diameter.

Operating limitation: 212°F with shaft speeds up to 1000 fpm. *Write*: Garlock Packing Co., 400 Main St., Palmyra, N. Y.

Variable Speed Drive

This electronic drive consists of an operator's control station, electronic control unit and a direct current motor.

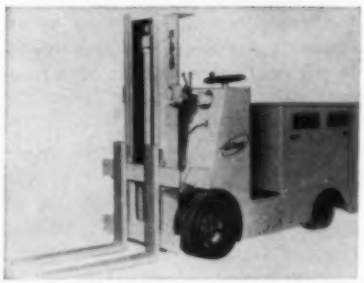
The electronic control uses an ignitron controlled, 3-phase, full wave rectifier system with its associated firing circuits.

Dynamic braking, reversing, forward - reverse - jog operation, tachometer feedback, acceleration and armature current limiting are standard features of the drive.

Capacities range from 30 to 150 hp. *Write*: Commercial Equipment Division, Raytheon Mfg. Co., 100 River St., Waltham 54, Mass. *Phone*: Twinbrook 3-5860

Fork Truck

This 6000-lb capacity stand-up truck has an unobstructed operator's compartment which enables the operator to enter from either side.



Travel speed with full load is 5 mph, without load 5.5 mph. Hoist speed, with full load is 20 fpm up, 40 fpm down; without load, 40 fpm up, 36 fpm down. *Write*: Elwell-Parker Electric Co., 4205 St. Clair Ave., Cleveland 3, O. *Phone*: Utah 1-6200

Arc Welder

This automatic submerged arc welder is for long seams (straight and curved) used in shipbuilding, large tanks and structural welding.

It will weld backward or forward. An adjustable nozzle permits welding on a flat butt joint or on a fillet joint.

The tractor-type unit has a wire reel and a molded flux hopper. *Write*: Hobart Bros. Co., Hobart Square, Troy, O. *Phone*: 2-1223

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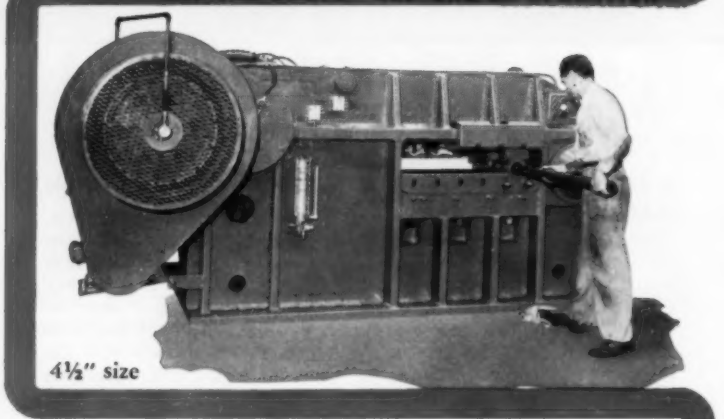
In Billet Shears . . .
Now Proven In Service
HILL ACME BAR BILLET SHEAR
GET THE FACTS—SEE ONE IN OPERATION



- Simplicity of Design. Clean, square cuts. Low maintenance.
- You'll be amazed at it's performance. You'll be surprised at the price.
- Made in 3", 4½", 6½" sizes and larger. Choice of hand, semi-automatic or fully automatic feed.

Full details and specifications are given in Bulletin SP-56.

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"HILL" GRINDING & POLISHING MACHINES • HYDRAULIC SURFACE GRINDERS • ALSO MANUFACTURERS OF "ACME" FORGING • THREADING TAPPING MACHINES • "CANTON" ALLIGATOR SHEARS • BILLET SHEARS • PORTABLE FLOOR CRANES • "CLEVELAND" KNIVES • SHEAR BLADES

NEW literature

Write directly to the company for a copy

Research Reactors

Bulletin GEA 6326-B, 12 pages, depicts swimming pool, heavy water and nuclear test reactors. Apparatus Sales Division, General Electric Co., Schenectady 5, N. Y.

Stainless Castings

A 28-page bulletin lists data on corrosion and heat resisting stainless steel castings. Advertising Department, Allegheny Ludlum Steel Corp., 2020 Oliver Bldg., Pittsburgh 22, Pa.

Brush Finishing

This 20-page bulletin describes machines used in brush finishing and illustrates the work they do. Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland, O.

Fuel Burning System

Bulletin 1231-A, 6 pages, describes a packaged combustion assembly which uses gas, oil or combination gas-oil firing. Orr & Sembower Inc., Morgantown Rd., Reading, Pa.

Precision Spindles

Catalog 20, 46 pages, presents data on grinding, boring, drilling, milling and routing work heads. Standard Electrical Tool Co., 2488-96 River Rd., Cincinnati 4, O.

Locomotive Cranes

This 14-page bulletin illustrates the features of locomotive cranes used in scrap handling. Ohio Locomotive Crane Co., Bucyrus, O.

Alloy Chains

A wall chart gives working loads and instructions for the use of alloy chains and slings. S. G. Taylor Chain Co. Inc., Hammond, Ind.

Gas Liquefier

A 6-page bulletin depicts the operating cycle and construction of a gas liquefier. Instrument Division, North American Philips Co. Inc., 750 S. Fulton Ave., Mt. Vernon, N. Y.

Alloy Guide

A chart lists comparative strengths at high temperatures, scaling resistance and properties of heat-resisting alloys. Techalloy Co. Inc., Rahns, Pa.

Truck Batteries

Bulletin IT-524/56, 4 pages, covers a line of batteries for rider-type electric industrial trucks. Batteries for hand motorized lift trucks are covered in bulletin IT-525/56, 4 pages. Advertising Department, C & D Batteries Inc., Conshohocken, Pa.

Conveyor Lubricators

New models of automatic lubricators for conveyors are covered in bulletin CL956, 8 pages. J. N. Fauver Co. Inc., 49 W. Hancock Ave., Detroit 1, Mich.

Special Alloys

This booklet on cobalt, nickel and iron-base alloys and their use in machinery parts details properties, heat treating and machining. Advertising Distribution Section, Haynes Stellite Co., 30-20 Thompson Ave., Long Island City 1, N. Y.

Grinding Accessories

Work blades and guides for centerless grinding and lapping machines are described in bulletin G-678, 30 pages. Cincinnati Milling Machine Co., Cincinnati 9, O.

Aluminized Steel

This 4-page bulletin, P.O. 3056, describes a steel with high heat reflectivity, resistance to combinations

WHY POSTPONE PLANT EXPANSION
...because of lack of funds or high interest rates?

100% FINANCING now available at low interest rates

In WESTern PENNsylvania, qualifying firms can finance up to 100% of the cost of existing plant space . . . at an average 3½% *interest rate.* Take advantage of this cost-saving, capital-conserving, plan . . . made possible through a unique combination of community, state and commercial bank financing.

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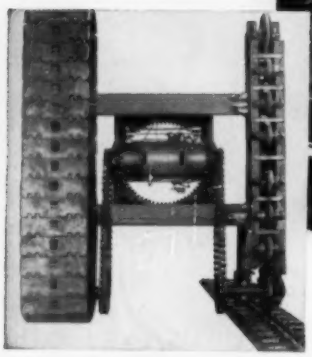
WEST PENN POWER

an operating unit of the WEST PENN ELECTRIC SYSTEM

This Heavy-Duty 22-B with 50-ft. boom and 20-ft. jib loads drums of enamel onto a barge for a company in Follansbee, West Virginia.



Heavy-Duty mounting is available with flat or tapered ends and 26-, 30-, or 36-in. treads.

Heavy-Duty 22-B Cuts Handling Costs

For material handling jobs around your plant, the Bucyrus-Erie Heavy-Duty 22-B crawler crane offers many money saving advantages.

Long-frame crawler mounting and low center of gravity provide great stability . . . make lifting of heavier loads possible. Extra-sturdy construction extends all the way up the boom, which is readily extended to 70-ft. length by using removable inserts. Additional 10-, 20-, or 30-ft. jibs also help you build your stockpiles higher. Four-way safety power controlled lowering for boom hoist plus independent control lets you inch heaviest loads into position. Propelling speeds provide for efficient moving. Fast moves can be made with the selective high propel speed; normal moves with low speed propel.

These features and many others add up to more efficient yard operation . . . less overhead. For more information, contact your nearby Bucyrus-Erie distributor soon. 248E56

BUCYRUS ERIE

SOUTH MILWAUKEE
WISCONSIN

NEW LITERATURE

of heat and corrosion and the surface qualities of aluminum. Product Information Service, Armco Steel Corp., Middletown, O.

Parts Storage

Steel containers that help speed storage, processing and assembly operations are described in bulletin 505, 20 pages. Stackbin Corp., 1123 Main St., Pawtucket, R. I.

Milling Machine

An 8-page bulletin describes an automatic milling machine with an index mechanism which is an integral part of the horizontal work table. Producto Machine Co., 990 Housatonic Ave., Bridgeport 1, Conn.

Firebrick

A 2-page bulletin describes a plastic firebrick for industrial boilers and furnaces. J. H. France Refractories Co., 3162 France Rd., Snow Shoe, Pa.

Rubber Parts

Relative properties of natural and synthetic rubbers are included in an 8-page bulletin on custom-molded parts. Molded Rubber Products Division, Tyer Rubber Co., Andover, Mass.

Press Inclining Device

An air motor that inclines presses or brings them upright is described in supplement 56-57-58. Niagara Machine & Tool Works, 683 Northland Ave., Buffalo 11, N. Y.

Monel Electrode

This bulletin describes an arc welding electrode used with reverse polarity direct current for welding carbon steel or Monel metal. McKay Co., 1005 Liberty Ave., Pittsburgh 22, Pa.

FILMS AVAILABLE

"The Rockford Kopy-Kat" shows the design and operation of an auxiliary tracing attachment for shapers, planers, slotters and lathes. The 16-mm color movie lasts 36 minutes. It pictures a variety of duplicating jobs. Department NN, Rockford Machine Tool Co., 2500 Kishwaukee St., Rockford, Ill.

The story of electrostatic spray painting is told in "The Big Attraction," a 30-minute, 16-mm sound and color film. It shows production line applications in large and small plants. Contact Ransburg Electro-Coating Corp., Barth & Sanders St., Indianapolis 7, Ind.

WE TAKE CARE OF ALL SIZES

Whether your ferro-alloy requirements be a barge load or drum, lump size or crushed, we are prepared to supply your needs.

Ohio Ferro-Alloys Corporation
Canton, Ohio

Why designers specify FLEXLOC self-locking nuts

Where products must be tough . . . must stand up under vibration, shock and abuse . . . designers specify rugged, reliable, precision-built FLEXLOC self-locking nuts as fasteners.

HERE'S WHY:
FLEXLOC locknuts are strong: tensile strengths far exceed accepted standards. They are uniform: carefully manufactured to assure accurate, lasting spring tension in the flexible locking collars. And they are reusable: rough screw threads, repeated removal and replacement, frequent adjustments will not affect their locking life.

Standard FLEXLOC self-locking locknuts are available in a wide range of standard sizes and materials, to meet the most critical locknut requirements. Your authorized industrial distributor stocks them. Write us for complete catalog and technical data. Flexloc Locknut Division, STANDARD PRESSED STEEL CO., Jenkintown 33, Pa.

STANDARD PRESSED STEEL CO.

FLEXLOC® LOCKNUT DIVISION

SPS
JENKINTOWN PENNSYLVANIA

STEEL

February 11, 1957

Market Outlook

STEEL is becoming easier to get, but you can rule out thoughts of an easing in price. The price trend will be in the other direction.

Prices are on the uptrend now, mainly through revision of extras. If steel producers didn't think the increases would stick, they wouldn't be making them. Producers point out the raw material cost increases set off by the round of steel wage boosts last summer are still going on. Iron ore, for example, is up 5.5 per cent.

AGAIN AND AGAIN—Steelworkers received another upward nudge the first of this year in their wages as a result of the rising cost of living. Their new contract calls for this automatic adjustment. Next July 1, the steelworkers will get another wage increase.

WAY TO COMPETE—If, in some cases, competition for steel orders becomes particularly severe, producers may absorb some of the freight charges for delivering material. They did this in 1954 during the steel inventory recession. But they held the line on prices. Producers contended steel was underpriced—that government price controls during World War II and the Korean War never allowed steel to climb to its natural level.

POSSIBILITY—An exception to price cutting may be seen with producers charging premium prices. There are a few of these companies; they are small. When steel is in strong demand, they charge (and get) premium prices. When business slows down, they reduce their prices.

Another thing arguing against a general reduction in steel prices is the absence of an abnormally high level of steel inventories. In some forms of steel (like heavy plates, structural shapes, large diameter line pipe, oil country tubular goods and nickel-bearing stainless steel), there isn't enough tonnage to go around.

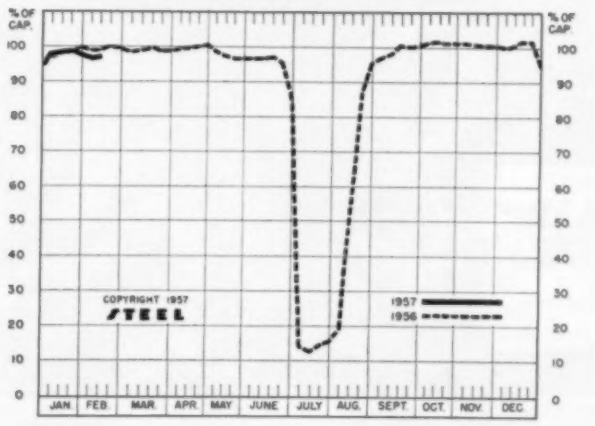
HIGH CONSUMPTION—Also refuting any thoughts of a general reduction in steel prices is the probability of an over-all steel consumption that will equal, if not exceed, the record. Metalworking companies expect their dollar volume of sales this year to set a record of $145 billion—more than 7 per cent above last year's, a record. They expect only about half of this gain to stem from increased prices. The other half would be a rise in physical volume of their sales.

Bolstering their expectations of a high level of business is the backlog of orders for durable goods. If new orders ceased entirely (and this won't happen), there are enough on the books to keep production running into mid-June.

STRONGER—One of the industries running near top speed now is steel. In the week ended Feb. 10, it produced steel for ingots and castings at 97 per cent of capacity (which is near the all-time high). This pace is half a point higher than it was in the preceding week.

RETREAT—In contrast to the general uptrend in the prices of steelmaking materials is the price of scrap. It continues its descent from record levels. At the peak reached in December, STEEL's price composite on steelmaking grades registered $66.17 a gross ton. In the week ended Feb. 6, it was $55.17, down 83 cents from that of the preceding week. The composite is still above the year-ago level of $50.33.

NATIONAL STEELWORKS OPERATIONS



DISTRICT INGOT RATES

(Percentage of Capacity Engaged)

	Week Ended Feb. 10	Change	Same Week 1956	Same Week 1955
Pittsburgh	99	— 0.5*	103	84
Chicago	96.5	+ 0.5*	99.5	91
Mid-Atlantic	98	0	101	85
Youngstown	102	+ 2	98	89
Wheeling	100.5	— 2	100.5	95.5
Cleveland	95	0*	100	95
Buffalo	107.5	+ 2.5	105	100
Birmingham	94.5	— 2	95.5	79
New England	74	+ 4	88	79
Cincinnati	90	0	98.5	90.5
St. Louis	99.5	0*	90	86.5
Detroit	101.5	0	99	84.5
Western	103	+ 1*	107	87
National Rate	97	+ 0.5	99	88

INGOT PRODUCTION‡

	Week Ended Feb. 10	Week Ago	Month Ago	Year Ago
INDEX (1947-1949=100)	153.9†	155.5	156.8	151.8
NET TONS (In thousands)	2,472†	2,498	2,516	2,439

*Change from preceding week's revised rate. †Estimated. ‡Amer. Iron & Steel Institute. Weekly capacity (net tons): 2,559,490 in 1957; 2,461, 893 in 1956; 2,413,278 in 1955.

Metalworking Outlook—p. 47 Technical Outlook—p. 103

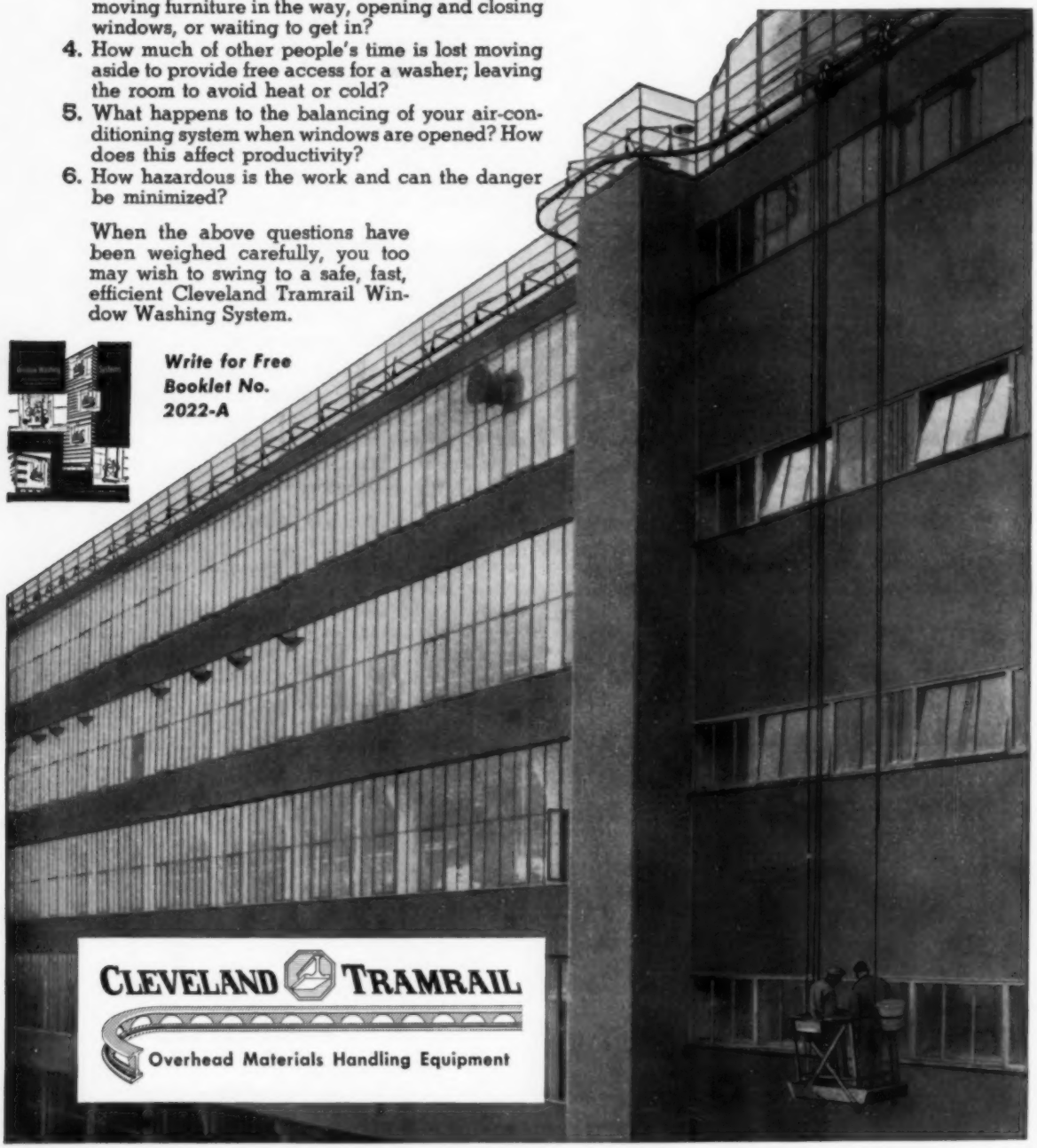
Ponder these Questions
ON WINDOW WASHING

1. How many square feet of glass can a man wash per day?
2. When working from the outside, how much time is lost in reaching windows?
3. When working from the inside, how much of a washer's time is lost enroute from office to office, moving furniture in the way, opening and closing windows, or waiting to get in?
4. How much of other people's time is lost moving aside to provide free access for a washer; leaving the room to avoid heat or cold?
5. What happens to the balancing of your air-conditioning system when windows are opened? How does this affect productivity?
6. How hazardous is the work and can the danger be minimized?

When the above questions have been weighed carefully, you too may wish to swing to a safe, fast, efficient Cleveland Tramrail Window Washing System.

Write for Free Booklet No. 2022-A

A Cleveland Tramrail Window Washing System enables one or two men to reach and clean entire walls of windows with safety. The special cage is suspended from an overhead carrier that travels on a track attached to the building. This equipment is also helpful for pointing up, painting and minor repairs.



CLEVELAND TRAMRAIL

Overhead Materials Handling Equipment

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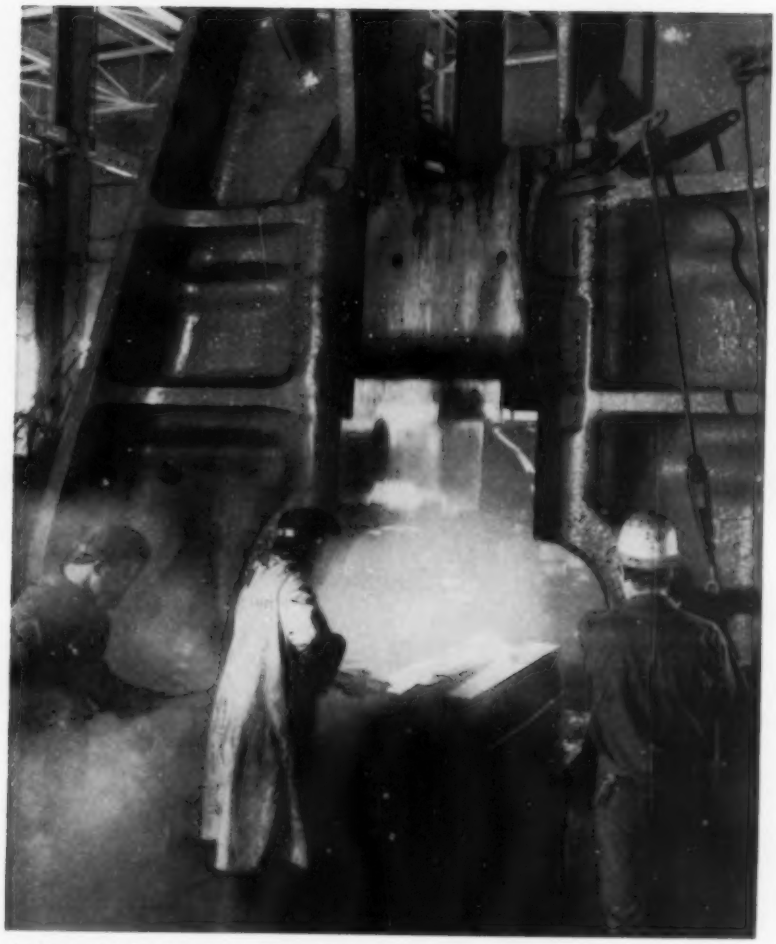

A 44-in. turbine blade is being forged under a 23,000-lb hammer at the metals development plant of Westinghouse Electric Corp., Blairsville, Pa. Makers of electric power plant equipment will be among the best customers for the forging industry during 1957

Good Year for Forgings

Shipments in 1956 were about equal to those in 1955 despite the steel strike. Industry anticipates holding to that level this year, although product mix will be different

"THE BIGGER the better," is the rule in demand for steel forgings. While uncertainty about 1957 operations slows sales to such industries as auto makers, demand for the largest, special-quality forgings continues to outstrip supply.

Despite the steel strike, requirements for forgings in 1956 were strong enough to keep sales close to the 1955 pace. Department of Commerce statistics show January-November shipments totaled 1,540,719 tons in 1956, compared with 1,592,555 tons for the first 11 months of 1955. Although total shipments remain level, sales of small forgings are dropping as demand for large ones rises.

Heavy Shipments — Demand is strongest in forgings ranging above 100 tons—they're for such uses as turbine rotors for electric power plants, heavy machinery parts and plant maintenance equipment. Sales managers at Midvale-Heppenstall Co., Philadelphia, comment: "Demand and production of large forgings this year should be as good or better than in 1956." Demand continues to surpass supply in forgings sold to electrical firms supplying marine and private power industries.

To help meet demand for heavy forgings, U.S. Steel Corp., Pittsburgh, this quarter will complete the installation of heat treating furnaces, machine tools and vacuum-casting facilities at its Homestead Works, Munhall, Pa. Chief purpose: To improve heat treating quality.

Greater Expansion — A second program of the corporation will increase capacity for production of turbine shafting. Also at Homestead, it will result in a new forging building, additional furnaces and large machine tools and increased electric furnace melting capacity (at Duquesne, Pa.) for large ingots. The program will be completed in two years.

"We can't keep up with orders from electrical equipment makers," sales managers of one of the large forgings firms comment. With power requirements continuing to soar, this branch of the forging industry will enjoy firm demand throughout 1957.

More Buyers — Other customers need large forgings badly. Their demands keep such suppliers as Bethlehem Steel Co., Bethlehem, Pa., busy. The Navy needs increased amounts of high-alloy ship propulsion shafting. Since the Suez crisis began, steel firms have noted an increase in inquiries about carbon steel forgings from builders of tankers. Increases in extrusion of aluminum and other nonferrous metals spur demand for forgings from builders of extrusion presses. Nuclear reactors require more forgings.

Shortages of semifinished steel and nickel are holding up deliveries of the largest forgings. "Processing time is less than six months, but due to shortages of ingots and nickel, users are ordering nine months to a year before they want delivery," one supplier comments. Some firms that want to be cer-

tain of delivery are placing orders on the books now for 1958 and early 1959 delivery.

Scarce Supply — "When a customer orders a nickel-bearing forging, the shortage of the metal compels us to ask him if he can trim his needs. Nickel is available for defense needs, but we try to restrict acceptance of orders for nickel-bearing forgings," one producer adds.

Commenting on the sales outlook, officials of Erie Forge & Steel Co., Erie, Pa., say demand for large diameter, heavy forgings taxes producers' capacities, but smaller forgings are in fairly good supply. Users of the largest forgings doubt that the supply pinch will be ended soon. "It requires too heavy an investment in men, equipment and steel for many companies to enter the field," they admit.

No Shortage Here — A STEEL survey shows that users of small and medium forgings should have no difficulty in obtaining steel this year. The sales outlook for producers of those forgings is mixed. Suppliers to railroad, road building and earth-moving equipment industries report firm demand. Some others report lagging sales. Edgewater Steel Co., Oakmont, Pa., reports that demand for wheels from railroads is strong. But an eastern supplier of flat die forgings reports: "We expect a decline from strong 1956 levels in sales to manufacturers of diesel engines and gas compressors."

In Detroit, sales to the automotive industry lack solid strength. A major drop forging firm is operating at 70 per cent of capacity. Suppliers to auto makers say those firms are allowing inventories to remain low. Fred B. Purdy, president, Huron Forge & Machine Co., Detroit, reports that there's some slowness in the market now, but adds: "We expect a gain in new orders for steel forgings in a month or two."

Herbert White, president, Cleveland Hardware & Forging Co., Cleveland, sums up sales in that area when he comments: "Road building machinery will be a good customer this year. Farm equipment demand will improve. If auto makers' sales reach 6.5 million, this will be a fairly good year for shipments to that industry."

Help Wanted—In several areas, the shortage of skilled hammermen and tool and diemakers is the biggest problem in supplying forgings. Among other problems cited are increasing cost of steel and need for steady improvement in quality control. On the brighter side is improving supply of steel. Given the metal, forgers expect to hammer out their other problems in 1957.

Reinforcing Bars . . .

Reinforcing Bar Prices, Page 147

Reinforcing bar contractors anticipate a sharp spurt in demand this spring. Much work is being held up pending more favorable building conditions.

In the Portland, Oreg., area construction activity continues strong. Fabricators are purchasing a large volume of reinforcing bars from the Oregon Steel Mills which re-

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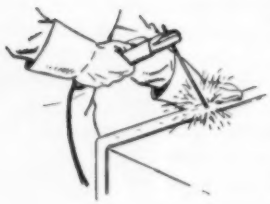

A-C Transformer Type
in 16 models from 20 to 800 amperes

A-C Submerged Arc Type
3 models, 150 to 1875 amperes

D-C Selenium Rectifier Type
12 models, 3 to 1500 amperes

D-C Selenium Rectifier Constant Potential Type
3 models, 300 to 1000 amperes

A-C/D-C Combinations for Metallic Arc Welding
6 models, 10 to 525 amperes

Spotwelders
14 models, 1.5 to 20 KVA

A-C and D-C Engine Driven Welders/Power Plants
6 models, 15 to 350 amperes

A-C/D-C Combinations for Inert Gas/Metallic Arc Welding
8 models, 10 to 550 amperes

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ports a substantial order backlog. Mills in the Seattle area are operating at capacity.

Sheets, Strip . . .

Sheet & Strip Prices, Pages 148 & 149

A gradual easing in demand for cold-finished sheets continues. Sellers are keeping their fingers crossed on second quarter prospects, especially as they apply to auto requirements. Leaders in the automotive industry haven't revised their earlier forecasts of a 6.5 million passenger car year—not publicly at least. If they move into the spring without changing estimates, prospects should be encouraging for steel producers.

Integrated suppliers of cold-rolled sheets have been able to shift the flow of ingots from sheet mills to other production lines. Demand remains firm for such products as plate and tin plate, and these lines can handle the larger tonnages of ingots. Mills are succeeding in keeping operations close to full capacity and in selling all the sheets they produce.

More mills are considering offerings of strip-mill plates, but sales managers want to determine the strength of second quarter sheet demand before actively seeking orders for light plate. Probably only a few firms will convert to strip mill plate production unless they are certain of large tonnage orders.

Steel Bars . . .

Bar Prices, Page 147

Jones & Laughlin Steel Corp., Pittsburgh, increased extras on hot-rolled bars and skelp about 3.5 per cent, effective Jan. 30. The changes are similar to those announced by other producers.

Agricultural and textile machinery requirements for bars are more promising than they were. While machine tool orders are smaller, builders have heavy order backlogs requiring substantial tonnages. Road building and construction equipment and mining machinery specifications are expected to continue at a high level. A pickup in auto requirements would assure excellent business in the bar market.

Hot-rolled bar suppliers expect second quarter demand to be firm,

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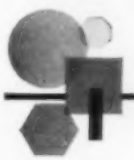

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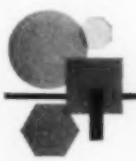
265 Pennsylvania Avenue, Hillside New Jersey



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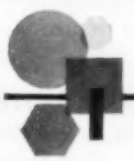

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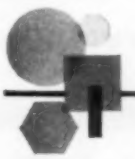

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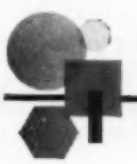

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but they add that sales probably will be below first quarter levels. Increased costs due to higher extras and large inventories held by users account for some slowness in the rate of incoming orders for second quarter delivery. Buying by forge shops is off about 20 per cent, compared with the first quarter of last year, due in most instances to a lag in automotive releases.

Most producers of hot-rolled carbon bars estimate carry-overs at the end of this quarter will not run over two weeks. This would be considered practically "current." Only in some sizes, particularly large rounds and flats, will their arrearages likely be heavier.

Cold-finished bar suppliers say demand is slow from their principal customers. They have no incentive to boost inventories further since hot-rolled bar supply is improving steadily. Orders can still be placed for March delivery.

Some mills are rolling reinforcing bars on their bar mills to keep operations at capacity. Demand for reinforcing bars is expected to be equal to capacity in the second quarter.

Plates . . .

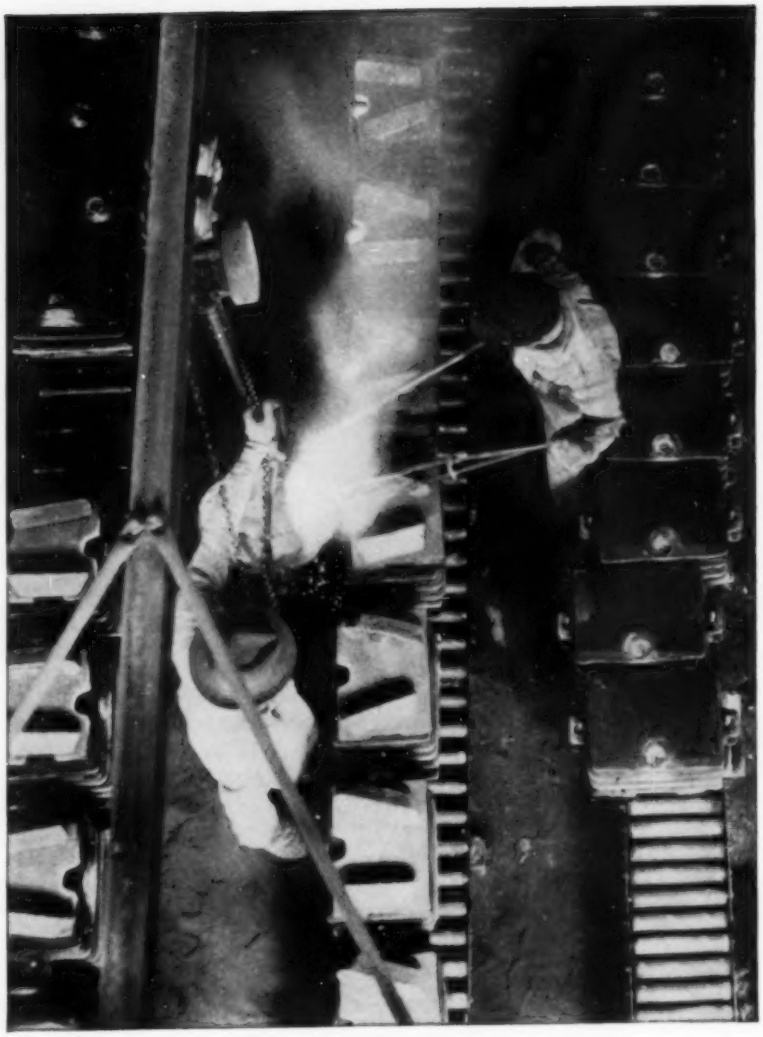
Plate Prices, Page 147

Some easing is noted in the supply of light plates. Two trends are chiefly responsible for this development. Plate mills have been assigned some extra ingots, due to diminishing demand for sheet. They are able to build their own semifinished steel supply and eliminate bottlenecks in their production lines.

"This extra tonnage will spread thin, but it will be welcome to us and to the buyer," says a producer in the Pittsburgh district.

In addition, increasing demand for plates in sizes ⅜-in. and lighter is being filled by strip mills. Pittsburgh mills are able to satisfy many users in their vicinity. In some areas of the country, the shortage of light plates is as severe as ever.

Heavy plates remain in short supply. Producers admit that they have only chipped away on the surface of the unfilled order backlog since the beginning of the year. The needs of shipbuilders remain



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heavy. They can use some light plates, but most of the required tonnage will be in the sizes which are hardest to obtain. Demands from makers of freight cars, plant equipment and machinery also are extremely heavy. Demand from line pipe and light tank fabricators also continues strong.

Some plate producers will have at least a five weeks' carry-over at the end of this quarter.

Bethlehem Steel Co., Quincy, Mass., shipyard is building four shipyards to handle three 100,000-ton tankers. Plates for the tankers will be wider and heavier than conventional specifications.

Wire . . .

Wire Prices, Pages 149 & 150

Order backlogs for manufacturers' wire tend to be thin. Bookings for the second quarter are slow. Most orders for heading and high-carbon wire do not extend beyond March.

Springmakers and other consumers tied in with the automotive industry are buying on a hand-to-mouth basis.

Prompt shipment, within normal lead time on most grades of industrial wire products, retards buying for inventory. Rod demand is not sufficient to absorb all tonnages available, although semifinished production has been cut back 15 to 20 points this quarter in the East.

New York Power Authority closes Feb. 26 on 275 miles of steel reinforced aluminum conductor cable for the Barnhart-Plattsburgh (N. Y.) transmission line.

Tubular Goods . . .

Tubular Goods Prices, Page 151

The merchant pipe market is generally soft. Tubemakers continue to book orders for late February and early March delivery.

Large diameter pipe (over 4 in.) is in heavy demand. This includes lapweld, electricweld and seamless. Seamless is in particularly short supply and is booked well into the second quarter.

In New England, steel pipe inquiry is bolstered by several large tonnages for piling, including 6200 tons (16 in., ⅜-in. wall) for a pier at the naval shipyard in Boston.

Jobbers have adequate stocks.

They expect demand to rise in the spring with increases scheduled in home building requirements for pipe.

Oil country goods suppliers are confident of filling second quarter order books. They foresee no slowdown in demand this summer. They expect a sharp increase in demand for alloy tube.

Warehouse . . .

Warehouse Prices, Page 152

Distributors are increasing their quotations on hot-rolled carbon bars to cover revisions in mill extras. They also anticipate making an upward revision in cold-finished bars because they expect the converters to revise their extras as a result of the hot mill changes.

Distributors look for February business to tend upward, on a daily average basis. Among the major products, sheets are moving the slowest in the Philadelphia district due to increasing competition from outside jobbers who apparently are overstocked.

In the Pittsburgh district, distributors are gradually improving their supplies of light plates and structural angles. They are unable to accumulate stocks of the heavier plates or of wide-flange beams.

Demand continues heaviest for plates and shapes. Sales of other products are affected by large stocks held by fabricators. Sheets and strip, wire and tubular products are moving slowly. Reinforcing bars are in fairly good demand.

Structural Shapes . . .

Structural Shape Prices, Page 147

Structural shape demand is brisk. Bookings are expected to improve soon because a number of jobs, particularly bridge work, appear to be on the verge of being placed. A growing number of medium-sized commercial and civic jobs are noted.

Many structural shops are booked over the remainder of this year and some well beyond. Modest sized jobs frequently can be worked in for delivery within five to six months.

Extended deliveries on large tonnages of fabricated bridge steel prompt the placement of orders as soon as possible through separate and direct contracts, while highway project plans are in process of being detailed. Including structurals, total highway requirements this year are estimated at 2.5 million tons. This is an increase of 200,000 tons over the 1956 requirements.

Mill price of highway steel has increased 12 per cent in 18 months —probably slightly more after the recent round of revisions in extras for structural shapes. With fabricators' labor, freight and other costs higher, increases are now more fully passed on to their customers. Earlier, competition retarded this action. With shops now booked well ahead, bargains in fabricated structural steel are few.

Fabricators report a continued scarcity of plain material. Second quarter allotments, now that mills are opening books for that period, are no larger than for the current quarter.

Rails, Cars . . .

Track Material Prices, Page 150

Structurals and wide plates (100 to 160 in. mill production) are the two steel products still worrying freight car building shops. Hot-rolled sheets, bars and strip-mill plates are in ample supply—shops are not accepting all tonnages offered to them. Two mills (Granite City Steel and Republic) are rolling 5/16-in. plates in coils.

Finished Steel Shipments—November, 1956*

FINISHED STEEL SHIPMENTS—November, 1956*
(Net Tons; All Grades)

Products	Carbon	Alloy	Stainless	11 Mo. 1956	11 Mo. 1955
Ingots, etc.	42,410	17,831	1,593	657,154	598,570
Blooms, slabs, etc.	143,417	47,868	2,881	2,054,336	2,512,132
Tube rounds	87	3	18	11,347	NA
Skelp	19,592	.....	.....	172,718	168,858
Wire rods	112,482	1,403	652	1,026,907	1,110,281
Structurals	517,288	4,346	11	4,834,656	4,287,848
Steel piling	46,930	.....	.....	384,953	355,107
Plates	722,931	47,696	4,280	7,107,709	6,084,758
Rails—standard	111,368	.....	.....	1,076,648	1,060,554
Rails—all other	7,032	.....	.....	92,027	74,708
Joint bars	5,931	.....	.....	75,933	62,593
Tie plates	20,394	.....	.....	271,286	285,403
Track spikes	5,508	.....	.....	88,146	85,939
Wheels	30,646	51	.....	318,968	276,478
Axles	15,916	13	.....	155,986	106,588
Bars—hot rolled	648,056	165,218	6,279	8,052,772	7,963,839
Bars—reinforcing	249,612	.....	.....	2,277,739	1,970,656
Bars—cold finished	108,543	23,893	6,553	1,607,767	1,702,438
Tool steel	1,535	8,354	.....	117,194	103,752
Standard pipe	267,479	.....	3	2,681,918	2,727,067
Oil country goods	191,600	33,947	.....	2,328,235	2,330,263
Line pipe	321,783	.....	.....	3,045,495	2,806,009
Mechanical tubing	59,389	20,515	540	878,139	876,933
Pressure tubing	28,586	5,614	1,939	349,925	248,286
Wire—drawn	238,994	4,435	2,785	2,772,493	2,914,628
Nails & staples	35,675	.....	1	528,390	616,088
Barbed wire	2,533	.....	.....	71,085	109,436
Woven fence	12,294	.....	.....	260,234	299,062
Bale ties	1,292	.....	.....	47,985	58,013
Black plate	54,929	.....	.....	716,774	736,391
Tin plate—HD	70,510	.....	.....	881,685	1,035,399
Tin plate—electro	325,408	.....	.....	4,326,172	4,240,550
Sheets—hot rolled	758,779	40,241	2,780	7,960,889	8,544,187
Sheets—cold rolled	1,168,285	6,266	14,330	12,190,188	13,772,748
Sheets—galvanized	255,135	.....	.....	2,718,818	2,602,857
Sheets—other coated	16,032	.....	.....	211,221	248,493
Sheets—enameling	Not available. Included in cold-rolled sheets				
Electrical sheets & strip	9,663	58,730	.....	750,074	719,618
Strip—hot rolled	149,282	3,158	827	1,640,929	1,906,102
Strip—cold rolled	99,011	1,327	18,418	1,442,184	1,571,343
Total shipments	6,876,337	490,909	63,890	76,187,079	77,173,975

NA—Not available.
*Data from American Iron & Steel Institute.

STRUCTURAL SHAPES . . .

STRUCTURAL STEEL PLACED

6200 tons, Dorchester avenue, Columbia road over M.T.A. and New Haven Railroad, and Boston street, Boston, to Bethlehem Steel Co., Bethlehem, Pa., through Coleman Bros. Corp., Boston, general contractor.

3700 tons, state office building, Baltimore, through Blake Construction Co., Washington, to the Lehigh Structural Steel Co., Allentown, Pa.

3300 tons, plant building, Sikorsky Division, United Aircraft Corp., Stratford, Conn., to Harris Structural Steel Co., New York.

1500 tons, dam gates and hoists, Rocky Reach dam, Columbia river, Washington, to Seattle Division, Todd Shipyards Corp., New York, $3,060,754.

1000 tons or more, second Narrows bridge, Vancouver, B.C., to Dominion Bridge Co. Ltd., at $1,099,672, by the British Columbia Toll Highways & Bridges Authority, Victoria, B.C.

890 tons, New York University, Graduate School of Business Administration, Trinity and Cedar streets, New York, to Simon Holland & Son Inc., Brooklyn, N. Y.

600 tons, hangar, naval station, Willow Grove, Pa., to the Lehigh Structural Steel Co., Allentown, Pa.

400 tons, plant addition, U.S. Gage Co., Sellersville, Pa., to Easton Steel Structures, Easton, Pa.

400 tons, substation steel, Bonneville Power

Administration, Portland, Oreg.; to Creamer & Dunlap Inc., Tulsa, Okla., $124,762.

340 tons, state bridge, Lancaster county, Pennsylvania, through E. A. Dylor Co., Coatesville, Pa., to Bethlehem Steel Co., Bethlehem, Pa.

310 tons, power house, New York City Transit Authority, 59th street, Manhattan, N. Y., through Amdor Structures and Rosoff Bros., joint general contractors, to the Schacht Steel Construction Inc.

300 tons, spar mill, Boeing Airplane Co., Seattle, to Leckenby Structural Steel Co., Seattle; Sound Construction & Engineering Co., Seattle, general contractor.

180 tons, Sunset School, Seattle, to Leckenby Structural Steel Co.; Seattle; George E. Teufel Co., Seattle, general contractor.

195 tons, angles, arsenal, Raritan, N. J., to the Bethlehem Pacific Coast Steel Corp., San Francisco.

100 tons, reconstruction of Denny Hall, University of Washington, Seattle, to Leckenby Structural Steel Co., Seattle.

Unstated, low power test facility, propulsion project, Atomic Energy Commission; general contract to Arrington Construction Co., Idaho Falls, Idaho, at $1,119,280.

STRUCTURAL STEEL PENDING

11985 tons, five-span welded girder bridge superstructure, Farmington river, and four composite rolled beam bridges, Windsor-Windsor Locks, Conn.; City Iron Works, Hartford, Conn., low, $1,637,747.

5600 tons, bridge superstructure, over Chesapeake & Delaware canal, Summit, Del. Army Corps of Engineers, Philadelphia will request bids around Feb. 15 to closing about Mar. 13.

5162 tons, eight girder bridges, South Holland, Alsip and Willow Springs, Ill., Northern Illinois toll highway contract SNI-4A, for Illinois State Toll Highway Commission, Chicago; bids Feb. 28.

4123 tons, seven girder bridges, Proviso and Des Plaines, Ill., Northern Illinois toll highway contract SNI-4C, for Illinois State Toll Highway Commission, Chicago; bids Feb. 28.

3735 tons, six girder bridges, Hinsdale and Proviso, Ill., Northern Illinois toll highway contract SNA-4B, for Illinois State Toll Highway Commission, Chicago; bids Feb. 28.

3165 tons, superstructure of bridge STI-9, over Markham Yard, Illinois Central Railroad, Cook County, Ill., Northern Illinois toll highway, Tri-State route contract ST-1, for Illinois State Toll Highway Commission, Chicago; bids Feb. 28.

2649 tons, five girder bridges, Deerfield, Libertyville and North Aurora, Ill., Northern Illinois toll highway contract SNI-5, for Illinois State Toll Highway Commission, Chicago; bids Feb. 28.

1500 tons, hospital, Embreeville, Pa., for General State Authority, Turner Construction Co., New York, low on general contract.

330 tons, support facilities, Mitchell Air Field, Bellmore, L. I., N. Y., Bonwitt Construction Co., general contractor.

180 tons, two-span rolled beam bridge, Newton, Conn.; bids Jan. 28, Hartford, Conn.

193 tons, Garden Home District, Portland, Oreg., to unstated interest.

150 tons, sheet steel piling, Corps of Engineers, Philadelphia; bids asked.

80 tons, Mountain Home, Idaho, air base hospital; Donald M. Drake Co., Portland, Oreg., general contractor; low at $2,036,477.

Unstated, two power house cranes, 250 tons each; two lifting beams, 245 tons; also one 460-ton lifting beam; bids to Chelan County PUD, No. 1, Wenatchee, Wash., March 1.

REINFORCING BARS . . .

REINFORCING BARS PLACED

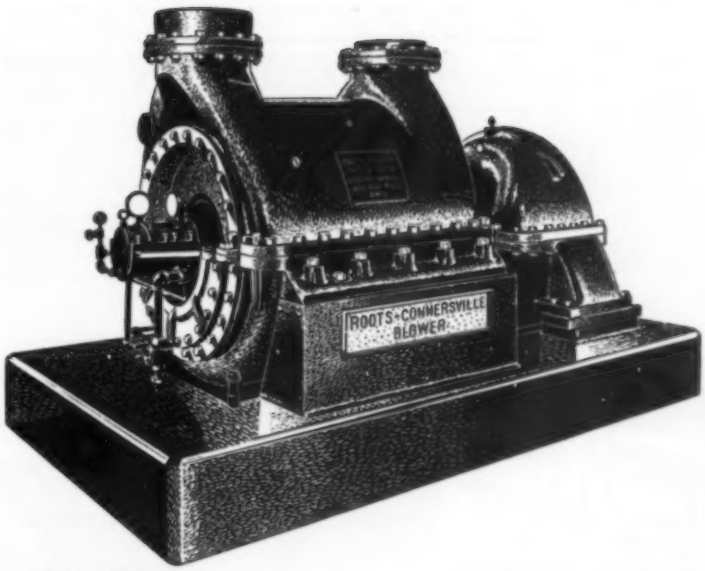
175 tons, plant building, Bird & Son Inc., Walpole, Mass., to the Concrete Steel Co., Boston; Vappi & Co. Inc., Cambridge, Mass., general contractor.

170 tons, St. Edward parish school, Seattle, to Soule Steel Co., Seattle.

90 tons, Washington state fisheries project, Sunset Falls, to Bethlehem Pacific Coast Steel Corp., Seattle.

REINFORCING BARS PENDING

856 tons, state bridge work, over Schuylkill river, near 30th St. Pennsylvania station and Pennsylvania boulevard, Philadelphia;



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ABC

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American Metal Market

1882 · 1957 75 ANNIVERSARY

18 Cliff St., New York 38, N.Y.

THE DAILY NEWSPAPER OF THE STEEL AND METAL INDUSTRIES. ESTABLISHED 1882

bids Feb. 21; 3454 tons of shapes also required.

500 tons, Northern Illinois toll highway, east-west route, contract E-2A, including erection of precast concrete bridges, Lisle and York townships, Dupage county, Ill., for the Illinois State Toll Highway Commission, Chicago; bids Feb. 14.

465 tons, five state highway bridges, including five-span welded girder, Framington river, and four composite rolled beam spans. Windsor-Windsor Locks, Conn.

465 tons, five state highway bridges, including five-span girder, Farmington river, and four composite rolled beam spans. Windsor-Windsor Locks, Conn.

433 tons, Northern Illinois toll highway, Tri-State route contract T-13-A, including erection of precast concrete bridges, Warren and Newport townships, Lake county, Illinois, for Illinois State Toll Highway Commission, Chicago; bids Feb. 21.

417 tons, Northern Illinois toll highway, contract N-3B, including erection of precast concrete bridges, Flora and Spring townships, Boone county, Ill., for the Illinois State Toll Highway Commision, Chicago; bids Feb. 14.

440 tons, two Washington state overpasses, King county; general contract to American Bridge Bridge Construction Co., Tacoma, Wash., low at $396,847.

400 tons, Chesapeake & Delaware canal bridge work, Summit, Del. Army Corps of Engineers will close bids around Mar. 19 with plans expected to be out about Feb. 15.

260 tons, addition to Columbia Hospital, Seattle; bid in.

200 tons, enforcement wing, Pierce County-City building, Tacoma, Wash.; additional general contract to the McDonald Construction Co., Tacoma, Wash.

200 tons, electricwelded mesh, concrete reinforcement, General Stores Supply Office, Navy, Philadelphia; bids Feb. 8, two contracts.

165 tons, two-span rolled beam bridge, Newton, Conn.

145 tons, Washington state railroad overcrossing, King county; bids to Olympia, Wash., Feb. 18.

100 tons, Washington state overcrossing, Thurston county; bids to Olympia, Wash., Feb. 18.

Unstated, hospital, Larson Air Base, Washington state; James I. Barnes Construction Co., Seattle, low at $1,801,128 to the U.S. Engineer.

PLATES . . .

PLATES PLACED

10,000 tons or more, tanks, etc., for the Texas Co.'s Puget Sound refinery, Anacortes, Wash., to the Chicago Bridge & Iron Co., Seattle.

3035 tons, hull and carbon plates, General Stores Supply Office, Navy, Philadelphia; two requisitions; to U.S. Steel Corp., Pittsburgh.

1258 tons, 63,000 linear ft of piling, Swift hydroelectric plant, Washington state, for the Pacific Power & Light Co., Portland, Oreg., to unstated interest.

550 tons, carbon plates, General Stores Supply Office, Navy, Philadelphia, to Columbia-Geneva Steel Division, U.S. Steel Corp., San Francisco.

200 tons or more, penstocks, Helena Valley, Mont., reclamation project, to the Columbia-Geneva Steel Division, U.S. Steel Corp., Provo, Utah; Puget Sound Bridge & Dredging Co., Seattle, general contractor.

200 tons, also structurals, two 170-ft welded steel barges for Foss Launch & Tug Co., Tacoma, Wash., to the Todd Shipyards Corp., Seattle.

100 tons, plus, 250,000-gal elevated tank, Larson Air Base, Washington state, to Chicago Bridge & Iron Co., Seattle, low at $96,613.

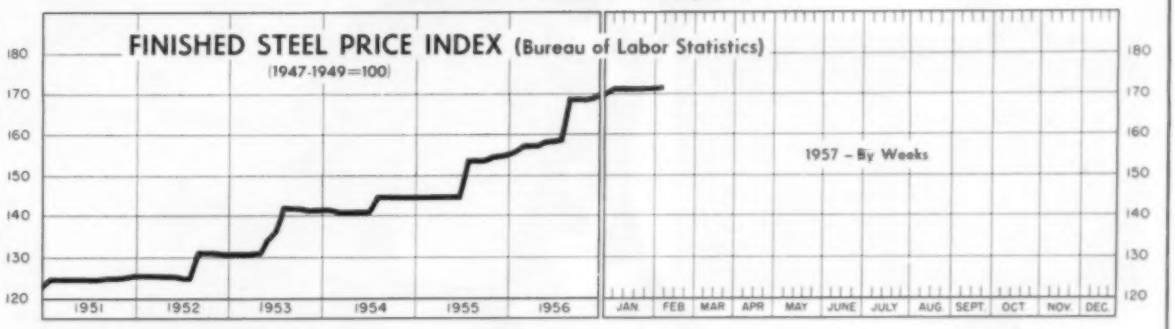
100 tons, water tank for Shelton, Wash., to Pittsburgh-Des Moines Steel Co., Seattle, low at $44,350.

PLATES PENDING

7000 tons or more, 100,000 ft of 42 to 54-in. water supply line; bids to Salem, Oreg., Feb. 21; Kent Mathewson, city manager; alternatives for concrete.

5700 tons, piling for Ice Harbor, Snake river project; bids in to the U.S. Engineer, Walla Walla, Wash.

Price Indexes and Composites



Feb. 5, 1957	Week Ago	Month Ago	Jan. Avg.	Year Ago
171.9	171.7	171.1	171.1	157.1

AVERAGE PRICES OF STEEL (Bureau of Labor Statistics)

Week Ended Feb. 5

Prices include mill base prices and typical extras and deductions. Units are 100 lb except where otherwise noted in parentheses. For complete description of the following products and extras and deductions applicable to them, write to STEEL.

Rails, Standard, No. 1	$5.150	Bars, Reinforcing	5.750
Rails, Light, 40 lb	6.567	Bars, C.F., Carbon	9.610
Tie Plates	6.025	Bars, C.F., Alloy	13.360
Axles, Railway	9.150	Bars, C.F., Stainless, 302 (lb)	0.533
Wheels, Freight Car, 33 in. (per wheel)	57.50	Sheets, H.R., Carbon	5.945
Plates, Carbon	5.900	Sheets, C.R., Carbon	6.789
Structural Shapes	5.667	Sheets, Galvanized	8.220
Bars, Tool Steel, Carbon (lb)	0.486	Sheets, C.R., Stainless, 302 (lb)	0.660
Bars, Tool Steel Alloy, Oil Hardening Die (lb)	0.585	Sheets, Electrical	11.225
Bars, Tool Steel, H.R., Alloy, High Speed, W 6.75, Cr 4.5, V 2.1, Mo 5.5, C 0.60 (lb)	1.274	Strip, C.R., Carbon	8.843
Bars, Tool Steel, H.R., Alloy, High Speed, W18, Cr 4, V 1 (lb)	1.769	Strip, C.R., Stainless, 403 (lb)	0.475
Bars, H.R., Alloy	10.050	Strip, H.R., Carbon	6.000
Bars, H.R., Stainless, 302 (lb)	0.508	Pipe, Black, Buttweld (100 ft)	18.376
Bars, H.R., Carbon	6.025	Pipe, Galv, Buttweld (100 ft)	22.516
		Pipe, Line (100 ft)	182.860
		Casing, Oil Well, Carbon (100 ft)	178.046
		Casing, Oil Well, Alloy (100 ft)	276.870
		Tubes, Boiler (100 ft)	46.033
		Tubing, Mechanical, Carbon (100 ft)	23.020
		Tubing, Mechanical, Stainless, 304 (100 ft)	192.763
		Tin Plate, Hot-dipped, 1.25 lb	9.433
		Tin Plate, Electrolytic, 0.25 lb	8.133
		Black Plate, Canmaking Quality	7.233
		Wire, Drawn, Carbon	9.175
		Wire, Drawn, Stainless, 430 (lb)	0.630
		Bale Ties (bundle)	7.213
		Nails, Wire, 8d Common	9.365
		Wire, Barbed (80-rod spool)	8.412
		Woven Wire Fence (20-rod roll)	20.505

STEEL's FINISHED STEEL PRICE INDEX*

	Feb. 6 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Index (1935-39 av.=100)	225.92	225.92	225.92	209.10	171.92
Index in cents per lb	6.111	6.111	6.111	5.665	4.657

STEEL's ARITHMETICAL PRICE COMPOSITES

	Feb. 6 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Finished Steel NT*	$137.96	$137.96	$137.96	$127.91	$106.32
No. 2 Fdry Pig Iron, GT	62.63	62.63	62.63	58.99	52.54
Basic Pig Iron, GT	62.18	62.18	62.18	58.49	53.16
Malleable Pig Iron, GT	63.41	63.41	63.41	59.77	53.27
Steelmaking Scrap, GT	55.17	56.00	60.83	50.33	43.00

*For explanation of weighted index see STEEL, Sept. 19, 1949, p. 54; of arithmetical price composite, STEEL, Sept. 1, 1952, p. 130.

Comparison of Prices

Comparative prices by districts, in cents per pound except as otherwise noted. Delivered prices based on nearest production point.

FINISHED STEEL

	Feb. 6 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bars, H.R., Pittsburgh	5.075	5.075	5.075	4.65	3.70
Bars, H.R., Chicago	5.075	5.075	5.075	4.65	3.70
Bars, H.R., deld, Philadelphia	5.365	5.365	5.365	4.90	4.223
Bars, C.F., Pittsburgh	6.55*	6.55*	6.55*	6.25*	4.55
Shapes, Std., Pittsburgh	5.00	5.00	5.00	4.60	3.65
Shapes, Std., Chicago	5.00	5.00	5.00	4.60	3.65
Shapes, deld., Philadelphia	5.31	5.31	5.31	4.88	3.918
Plates, Pittsburgh	4.85	4.85	4.85	4.50	3.70
Plates, Chicago	4.85	4.85	4.85	4.50	3.70
Plates, Coatesville, Pa.	5.25	5.25	5.25	4.80	4.15
Plates, Sparrows Point, Md.	4.85	4.85	4.85	4.50	3.70
Plates, Claymont, Del.	5.70	5.70	5.70	4.80	4.15
Sheets, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.60-3.75
Sheets, H.R., Chicago	4.675	4.675	4.675	4.325	3.60
Sheets, C.R., Pittsburgh	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Chicago	5.75	5.75	5.75	5.325	4.35
Sheets, C.R., Detroit	5.75-5.85	5.75-5.85	5.75-5.85	5.325-5.425	4.55
Sheets, Galv., Pittsburgh	6.30	6.30	6.30	5.85	4.80
Strip, H.R., Pittsburgh	4.675	4.675	4.675	4.325	3.75-4.00
Strip, H.R., Chicago	4.675	4.675	4.675	4.325	3.50
Strip, C.R., Pittsburgh	6.85	6.85	6.85	6.25	4.65-5.35
Strip, C.R., Chicago	6.85	6.85	6.85	6.25-6.35	4.90
Strip, C.R., Detroit	6.95	6.95	6.95	6.35	4.85-5.60
Wire, Basic, Pittsburgh	7.20	7.20	7.20	6.60	4.85-5.10
Nails, Wire, Pittsburgh	8.20	8.20	8.20	7.60	5.90-6.20
Tin plate (1.50 lb), box, Pitts.	$9.95	$9.95	$9.95	$9.45	$8.70

*Including 0.35c for special quality

SEMIFINISHED STEEL

Billets, forging, Pitts. (NT)	$91.50	$91.50	$91.50	$84.50	$66.00
Wire rods, $\frac{7}{32}$-$\frac{1}{2}$" Pitts.	5.80	5.80	5.80	5.025-5.375	4.10-4.30

PIG IRON, Gross Ton

	Feb. 6 1957	Week Ago	Month Ago	Year Ago	5 Yrs. Ago
Bessemer, Pitts.	$63.50	$63.50	$63.50	$59.50	$53.00
Basic, Valley	62.50	62.50	62.50	58.50	52.00
Basic, deld., Phila.	66.26	66.26	66.26	62.16	56.61
No. 2 Fdry, Neville Island, Pa.	63.00	63.00	63.00	59.00	53.50
No. 2 Fdry, Chicago	63.00	63.00	63.00	59.00	52.50
No. 2 Fdry, deld., Phila.	66.76	66.76	66.76	62.66	57.11
No. 2 Fdry, Birm.	59.00	59.00	59.00	55.00	48.88
No. 2 Fdry (Birm.) deld. Cin.	66.70	66.70	66.70	62.70	55.49
Malleable, Valley	63.00	63.00	63.00	59.00	52.50
Malleable, Chicago	63.00	63.00	63.00	59.00	52.50
Ferromanganese, Duquesne.	255.00†	255.00†	255.00†	205.00†	188.00*

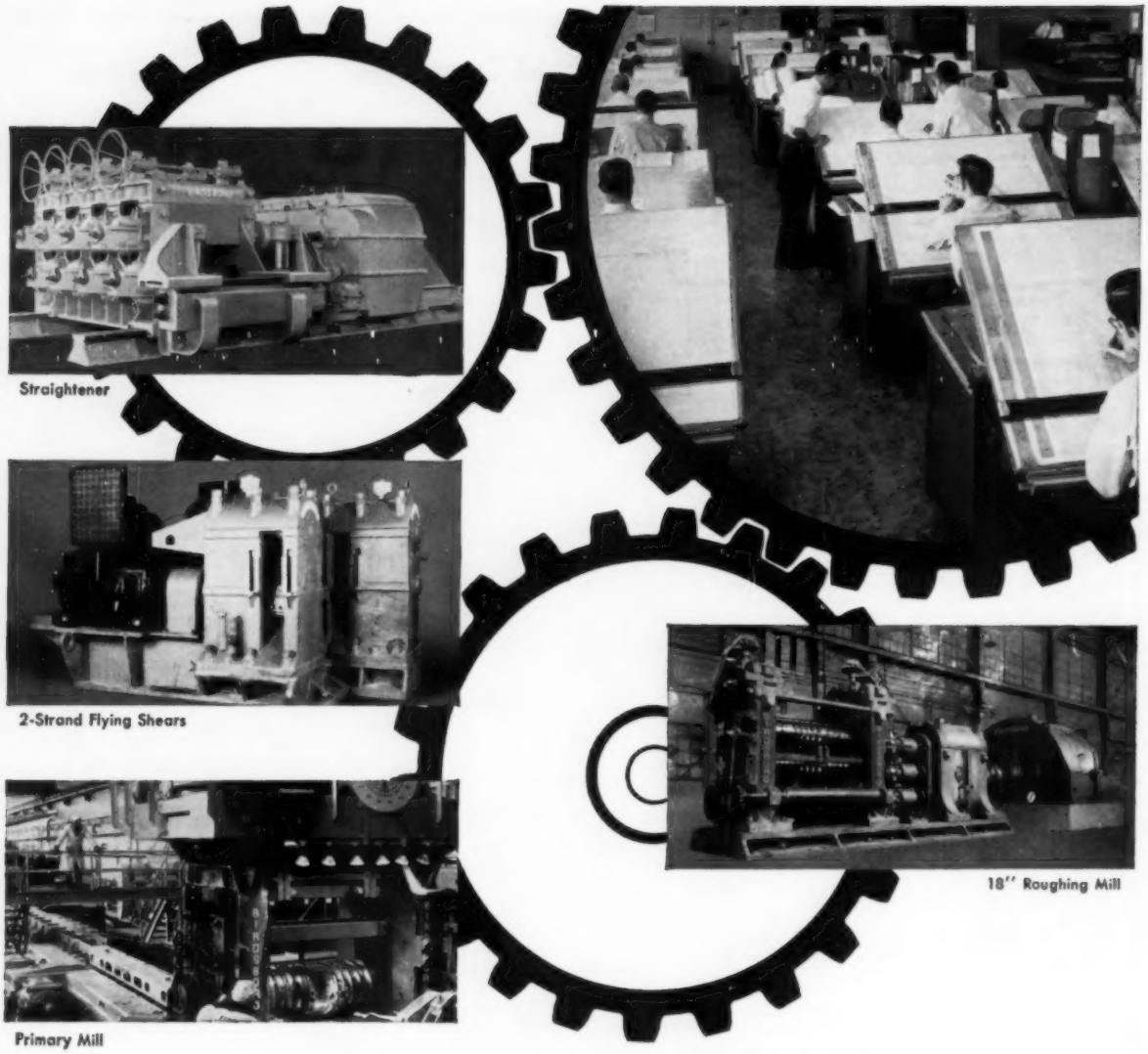
†74-76% Mn, net ton. *75-82% Mn, gross ton, Etna, Pa.

SCRAP, Gross Ton (including broker's commission)

No. 1 Heavy Melt, Pittsburgh	$54.50	$54.50	$62.50	$50.50	$44.00
No. 1 Heavy Melt, E. Pa.	59.00	59.00	61.00	51.50	42.50
No. 1 Heavy Melt, Chicago	52.00	54.50	59.00	49.00	42.50
No. 1 Heavy Melt, Valley	53.50	56.50	63.50	53.00	44.00
No. 1 Heavy Melt, Cleve.	51.50	53.50	60.50	49.50	43.00
No. 1 Heavy Melt, Buffalo	53.50	59.50	61.50	46.50	43.00
Rails, Rerolling, Chicago	71.00	71.50	84.50	66.50	52.50
No. 1 Cast, Chicago	46.50	48.50	50.50	46.50	49.00

COKE, Net Ton

Beehive, Furn, Connlsvl.	$15.00	$15.00	$15.00	$14.125	$14.75
Beehive, Fdry, Connlsvl.	18.00	18.00	18.00	16.50	17.50



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Steel Prices

Mill prices as reported to STEEL, cents per pound except as otherwise noted. *Changes shown in italics.* Code numbers following mill points indicate producing company. Key to producers, page 148; to footnotes, page 150.

SEMIFINISHED

INGOTS, Carbon, Forging (NT)

Munhall,Pa. U5 ..... $70.50

INGOTS, Alloy (NT)

Detroit R7 ..... $74.00
Houston S5 ..... 74.00
Midland,Pa. C18 ..... 74.00
Munhall,Pa. U5 ..... 74.00

BILLETS, BLOOMS & SLABS Carbon, Rerolling (NT)

Bessemer,Pa. U5 ..... $74.00
Bridgeport,Conn. N19 ..79.00
Buffalo R2 ..... 74.00
Clairton,Pa. U5 ..... 74.00
Ensley,Ala. T2 ..... 74.00
Fairfield,Ala. T2 ..... 74.00
Fontana,Calif. K1 ....83.50
Gary,Ind. U5 ..... 74.00
Johnstown,Pa. B2 ..... 74.00
Lackawanna,N.Y. B2 ..74.00
LoneStar,Tex. L6 ..... 80.00
Munhall,Pa. U5 ..... 74.00
S.Chicago,Ill. R2, U5..74.00
S.Duquesne,Pa. U5 ....74.00
Sterling,Ill. N15 ..... 74.00
Youngstown R2 ..... 74.00

Carbon, Forging (NT)

Bessemer,Pa. U5 ..... $91.50
Bridgeport,Conn. N19 .96.50
Buffalo R2 ..... 91.50
Canton,O. R2 ..... 94.00
Clairton,Pa. U5 ..... 91.50
Conshohocken,Pa. A3 ..96.50
Ensley,Ala. T2 ..... 91.50
Fairfield,Ala. T2 ..... 91.50
Fontana,Calif. K1 ....101.00
Gary,Ind. U5 ..... 91.50
Geneva,Utah C11 ..... 91.50
Houston S5 ..... 96.50
Johnstown,Pa. B2 ..... 91.50
Lackawanna,N.Y. B2 ..91.50
LosAngeles B3 ..... 101.00
Midland,Pa. C18 ..... 91.50
Munhall,Pa. U5 ..... 91.50
Seattle B3 ..... 105.00
S.Chicago R2, U5, W14 91.50
S.Duquesne,Pa. U5 ....91.50
S.SanFrancisco B3 ....101.00

Alloy, Forging (NT)

Bethlehem,Pa. B2 ...$107.00
Bridgeport,Conn. N19. 107.00
Buffalo R2 ..... 107.00
Canton,O. R2 ..... 107.00
Conshohocken,Pa. A3 .114.00
Detroit R7 ..... 107.00
Fontana,Calif. K1 ....128.00
Gary,Ind. U5 ..... 107.00
Houston S5 ..... 112.00
Ind.Harbor,Ind. Y1 ..107.00
Johnstown,Pa. B2 ....107.00
Lackawanna,N.Y. B2 .107.00
LosAngeles B3 ..... 127.00
Massillon,O. R2 ..... 107.00
Midland,Pa. C18 ..... 107.00
Munhall,Pa. U5 ..... 107.00
S.Chicago R2,U5,W14 .107.00
S.Duquesne,Pa. U5 ...107.00
Struthers,O. Y1 ..... 107.00
Warren,O. C17 ..... 107.00

ROUNDS, SEAMLESS TUBE (NT)

Bridgeport,Conn. N19 $116.50
Buffalo R2 ..... 111.50
Canton,O. R2 ..... 114.00
Cleveland,O. R2 ..... 111.50
Gary,Ind. U5 ..... 111.50
S.Chicago,Ill. R2, W14 .111.50
S.Duquesne,Pa. U5 ...111.50

SKELP

Aliquippa,Pa. J5 ..... 4.725
LoneStar,Tex. L6 ..... 5.025
Munhall,Pa. U5 ..... 4.625
Warren,O. R2 ..... 4.625
Youngstown R2, U5 ...4.625

WIRE RODS

AlabamaCity,Ala. R2 ...5.80
Aliquippa,Pa. J5 ..... 5.80
Alton,Ill. L1 ..... 6.00
Buffalo W12 ..... 5.80
Cleveland A7 ..... 5.80
Donora,Pa. A7 ..... 5.80
Fairfield,Ala. T2 ..... 5.80
Houston S5 ..... 6.05
IndianaHarbor,Ind. Y1..5.80
Johnstown,Pa. B2 ..... 5.80
Joliet,Ill. A7 ..... 5.80
KansasCity,Mo. S5 ..... 6.05
Kokomo,Ind. C18 ..... 5.90
LosAngeles B3 ..... 6.60
Minnequa,Colo. C10 ....6.05
Monessen,Pa. P7 ..... 5.80
N.Tonawanda,N.Y. B11 .5.80
Pittsburg,Calif. C11 ....6.45
Portsmouth,O. P12 ..... 5.80
Roebling,N.J. R5 ..... 5.90
S.Chicago,Ill. R2 ..... 5.80
SparrowsPoint,Md. B2 ..5.90
Sterling,Ill.(1) N15 ..... 5.80
Sterling,Ill. N15 ..... 5.90
Struthers,O. Y1 ..... 5.80
Worcester,Mass. A7 ....6.10

STRUCTURALS

Carbon Steel Std. Shapes

Ala.City,Ala. R2 ..... 5.00
Aliquippa,Pa. J5 ..... 5.00
Bessemer,Ala. T2 ..... 5.00
Bethlehem,Pa. B2 ..... 5.05
Birmingham C15 ..... 5.25
Clairton,Pa. U5 ..... 5.00
Fairfield,Ala. T2 ..... 5.00
Fontana,Calif. K1 ..... 5.75
Gary,Ind. U5 ..... 5.00
Geneva,Utah C11 ..... 5.00
Houston S5 ..... 5.10
Ind.Harbor,Ind. I-2 ..... 5.00
Johnstown,Pa. B2 ..... 5.05
KansasCity,Mo. S5 ..... 5.10
Lackawanna,N.Y. B2 ..5.05
LosAngeles B3 ..... 5.70
Minnequa,Colo. C10 ....5.30
Munhall,Pa. U5 ..... 5.00
Niles,Calif. P1 ..... 5.75
Phoenixville,Pa. P4 ....5.85
Portland,Oreg. O4 ..... 5.80
Seattle B3 ..... 5.75
S.Chicago,Ill. U5, W14..5.00
S.SanFrancisco B3 .....5.65
Sterling,Ill. N15 ..... 5.00
Torrance,Calif. C11 ....5.70
Weirton,W.Va. W6 ..... 5.00

Wide Flange

Bethlehem,Pa. B2 ..... 5.05
Clairton,Pa. U5 ..... 5.00
Fontana,Calif. K1 ..... 5.90
IndianaHarbor,Ind. I-2..5.25
Lackawanna,N.Y. B2 ...5.05
Munhall,Pa. U5 ..... 5.00
Phoenixville,Pa. P4 ....5.85
S.Chicago,Ill. U5 ..... 5.00

Alloy Std. Shapes

Aliquippa,Pa. J5 ..... 6.20
Clairton,Pa. U5 ..... 6.20
Gary,Ind. U5 ..... 6.20
Houston S5 ..... 6.30
Munhall,Pa. U5 ..... 6.20
S.Chicago,Ill. U5 ..... 6.20

H.S., L.A. Std. Shapes

Aliquippa,Pa. J5 ..... 7.35
Bessemer,Ala. T2 ..... 7.35
Bethlehem,Pa. B2 ..... 7.40
Clairton,Pa. U5 ..... 7.35
Fairfield,Ala. T2 ..... 7.35
Fontana,Calif. K1 ..... 8.10
Gary,Ind. U5 ..... 7.35
Geneva,Utah C11 ..... 7.35
Houston S5 ..... 7.45
Ind.Harbor,Ind. I-2, Y1..7.35
Johnstown,Pa. B2 ..... 7.40
KansasCity,Mo. S5 ..... 7.45
Lackawanna,N.Y. B2 ...7.40
LosAngeles B3 ..... 8.05
Munhall,Pa. U5 ..... 7.35
Seattle B3 ..... 8.10
S.Chicago,Ill. U5, W14..7.35
S.SanFrancisco B3 .....8.00
Struthers,O. Y1 ..... 7.35

H.S., L.A. Wide Flange

Bethlehem,Pa. B2 ..... 7.40
Lackawanna,N.Y. B2 ...7.40
Munhall,Pa. U5 ..... 7.35
S.Chicago,Ill. U5 ..... 7.35

PILING

BEARING PILES

Bethlehem,Pa. B2 ..... 5.05
Lackawanna,N.Y. B2 ....5.05
Munhall,Pa. U5 ..... 5.00
S.Chicago,Ill. U5 ..... 5.00

STEEL SHEET PILING

Lackawanna,N.Y. B2 ...5.90
Munhall,Pa. U5 ..... 5.90
S.Chicago,Ill. U5 ..... 5.90

PLATES

PLATES, Carbon Steel

Ala.City,Ala. R2 ..... 4.85
Aliquippa,Pa. J5 ..... 4.85
Ashland,Ky.(15) A10 ....4.85
Bessemer,Ala. T2 ..... 4.85
Bridgeport,Conn. N19 ..4.75
Clairton,Pa. U5 ..... 4.85
Claymont,Del. C22 ..... 5.70
Cleveland J5, R2 ..... 4.95
Coatesville,Pa. L7 ..... 5.25
Conshohocken,Pa. A3 ....4.95
Detroit M1 ..... 4.95
Ecorse,Mich. G5 ..... 4.95
Fairfield,Ala. T2 ..... 4.85
Fontana,Calif.(30) K1 ..5.60
Gary,Ind. U5 ..... 4.85
Geneva,Utah C11 ..... 4.85
GraniteCity,Ill. G4 ..... 5.05
Harrisburg,Pa. P4 ..... 5.80
Houston S5 ..... 4.95
Ind.Harbor,Ind. I-2, Y1..4.85
Johnstown,Pa. B2 ..... 4.85
Lackawanna,N.Y. B2 ..4.85
LoneStar,Tex. L6 ..... 5.20
Minnequa,Colo. C10 ....5.70
Munhall,Pa. U5 ..... 4.85
Newport,Ky. A2 ..... 4.85
Pittsburgh J5 ..... 4.85
Riverdale,Ill. A1 ..... 4.85
Seattle B3 ..... 5.75
Sharon,Pa. S3 ..... 4.85
S.Chicago,Ill. U5, W14..4.85
SparrowsPoint,Md. B2 ..4.85
Steubenville,O. W10 ....4.85
Warren,O. R2 ..... 4.85
Weirton,W.Va. W6 ..... 4.85
Youngstown R2, U5, Y1.4.85

PLATES, Carbon Abras. Resist.

Claymont,Del. C22 .....6.20
Fontana,Calif. K1 ..... 6.75
Geneva,Utah C11 ..... 6.00
Johnstown,Pa. B2 ..... 5.65
SparrowsPoint,Md. B2 ..5.65

PLATES, Wrought Iron

Economy,Pa. B14 ..... 11.95

PLATES, H.S., L.A.

Aliquippa,Pa. J5 ..... 7.25
Bessemer,Ala. T2 ..... 7.25
Clairton,Pa. U5 ..... 7.25
Claymont,Del. C22 ..... 7.55
Cleveland J5, R2 ..... 7.25
Coatesville,Pa. L7 ..... 7.55
Conshohocken,Pa. A3 ..7.25
Ecorse,Mich. G5 ..... 7.35
Fairfield,Ala. T2 ..... 7.25
Fontana,Calif.(30) K1 ..8.00
Gary,Ind. U5 ..... 7.25
Geneva,Utah C11 ..... 7.25
Houston S5 ..... 7.35
Ind.Harbor,Ind. I-2, Y1..7.25
Johnstown,Pa. B2 ..... 7.25
Munhall,Pa. U5 ..... 7.25
Pittsburgh J5 ..... 7.25
Seattle B3 ..... 8.15
Sharon,Pa. S3 ..... 7.25
S.Chicago,Ill. U5, W14..7.25
SparrowsPoint,Md. B2 ..7.25
Warren,O. R2 ..... 7.25
Youngstown U5, Y1 ..... 7.25

PLATES, Alloy

Aliquippa,Pa. J5 ..... 6.85
Bridgeport,Conn. N19 ..6.55
Claymont,Del. C22 ..... 6.85
Coatesville,Pa. L7 ..... 6.85
Fontana,Calif.(30) K1 ..7.60
Gary,Ind. U5 ..... 6.85
Houston S5 ..... 6.95
Ind.Harbor,Ind. Y1 ..... 6.85
Johnstown,Pa. B2 ..... 6.85
Munhall,Pa. U5 ..... 6.85
Newport,Ky. A2 ..... 6.85
Pittsburgh J5 ..... 6.85
Seattle B3 ..... 7.75
Sharon,Pa. S3 ..... 6.85
S.Chicago,Ill. U5, W14..6.85
SparrowsPoint,Md. B2 ..6.85
Youngstown Y1 ..... 6.85

FLOOR PLATES

Cleveland J5 ..... 5.925
Conshohocken,Pa. A3 ..5.925
Harrisburg,Pa. P4 ..... 6.275
Ind.Harbor,Ind. I-2 ....5.925
Munhall,Pa. U5 ..... 5.925
S.Chicago,Ill. U5 ..... 5.925

PLATES, Ingot Iron

Ashland c.l. (15) A10...5.10
Ashland l.c.l. (15) A10..5.60
Cleveland c.l. R2 ..... 5.60
Warren,O. c.l. R2 ..... 5.60

BARS

BARS, Hot-Rolled Carbon (Merchant Quality)

Ala.City,Ala.(9) R2 ....5.075
Aliquippa,Pa.(9) J5 ....5.075
Alton,Ill. L1 ..... 5.275
Atlanta(9) A11 ..... 5.075
Bessemer,Ala.(9) T2 ....5.075
Birmingham(9) C15 ..... 5.325
Bridgeport,Conn. N19 ..5.30
Buffalo(9) R2 ..... 5.075
Clairton,Pa. U5 ..... 5.075
Cleveland(9) R2 ..... 5.075
Ecorse,Mich.(9) G5 ....5.175
Emeryville,Calif. J7 ....5.80
Fairfield,Ala.(9) T2 ....5.075
Fairless,Pa.(9) U5 ..... 5.225
Fontana,Calif.(9) K1 ..5.775
Gary,Ind.(9) U5 ..... 5.075
Geneva,Utah(9) C11 ....5.175
Houston(9) S5 ..... 5.325
Ind.Harbor(9) I-2, Y1..5.075
Johnstown,Pa.(9) B2 ..5.075
Joliet,Ill. P22 ..... 5.575
KansasCity,Mo.(9) S5..5.325
Lackawanna(9) B2 ..... 5.075
LosAngeles(9) B3 ..... 5.775
Milton,Pa. M18 ..... 5.225
Minnequa,Colo. C10 ....5.525
Niles,Calif. P1 ..... 5.85
N.T'wanda,N.Y.(9) B11 5.075
Pittsburg,Calif.(9) C11..5.775
Pittsburgh(9) J5 ..... 5.075
Portland,Oreg. O4 ..... 5.85
Seattle B3, N14 ..... 5.825
S.Ch'c'go(9)R2,U5,W14 5.075
S.Duquesne,Pa.(9) U5 ..5.075
S.SanFran.,Calif.(9) B3 5.825
Sterling,Ill.(1) N15 ..... 5.075
Sterling,Ill. N15 ..... 5.175
Struthers,O. Y1 ..... 5.075
Torrance,Calif.(9) C11..5.775
Weirton,W.Va.(9) W6 ..5.075
Youngstown(9) R2, U5 5.075

BARS, H.R. Leaded Alloy (Including leaded extra)

Warren,O. C17 ..... 7.125

BARS, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.125
Bethlehem Pa. B2 ..... 6.125
Bridgeport,Conn. N19 ..6.20
Buffalo R2 ..... 6.125
Canton,O. R2 ..... 6.125
Clairton,Pa. U5 ..... 6.125
Detroit R7 ..... 6.125
Ecorse,Mich. G5 ..... 6.225
Fairless,Pa. U5 ..... 6.275
Fontana,Calif. K1 ..... 7.175
Gary,Ind. U5 ..... 6.125
Houston S5 ..... 6.375
Ind.Harbor,Ind. I-2,Y1.6.125
Johnstown,Pa. B2 ..... 6.125
KansasCity,Mo. S5 ..... 6.375
Lackawanna,N.Y. B2 ..6.125
LosAngeles B3 ..... 7.175
Massillon,O. R2 ..... 6.125
Midland,Pa. C18 ..... 6.125
Pittsburgh J5 ..... 6.125
S.Chicago R2,U5,W14 ..6.125
S.Duquesne,Pa. U5 ....6.125
Struthers,O. Y1 ..... 6.125
Warren,O. C17 ..... 6.125
Youngstown U5 ..... 6.125

BARS & SMALL SHAPES, H.R. High-Strength Low-Alloy

Aliquippa,Pa. J5 ..... 7.425
Bessemer,Ala. T2 ..... 7.425
Bethlehem,Pa. B2 ..... 7.425
Bridgeport,Conn. N19 ..7.50
Clairton,Pa. U5 ..... 7.425
Cleveland R2 ..... 7.425
Ecorse,Mich. G5 ..... 7.525
Fairfield,Ala. T2 ..... 7.425
Fontana,Calif. K1 ..... 8.125
Gary,Ind. U5 ..... 7.425
Houston S5 ..... 7.675
Ind.Harbor,Ind. Y1 ...7.425
Johnstown,Pa. B2 ..... 7.425
KansasCity,Mo. S5 ..... 7.675
Lackawanna,N.Y. B2 ..7.425
LosAngeles B3 ..... 8.125
Pittsburgh J5 ..... 7.425
Seattle B3 ..... 8.175
S.Chicago,Ill. U5, W14..7.425
S.Duquesne,Pa. U5 ....7.425
S.SanFrancisco B3 ....8.175
Struthers,O. Y1 ..... 7.425
Youngstown U5 ..... 7.425

BAR SIZE ANGLES; H.R. Carbon

Bethlehem Pa.(9) B2 ..5.225
Houston S5 ..... 5.325
KansasCity,Mo. S5 ..... 5.325
Lackawanna(9) B2 ..... 5.075
Sterling,Ill. N15 ..... 5.175
Sterling,Ill.(1) N15 ...5.075

BAR SIZE ANGLES; S. Shapes

Aliquippa,Pa. J5 ..... 5.075
Atlanta A11 ..... 5.575
Joliet Ill. P22 ..... 5.10
Niles,Calif. P1 ..... 5.85
Pittsburgh J5 ..... 5.075
Portland,Oreg. O4 ..... 5.85
SanFrancisco S7 ..... 5.95

BAR SHAPES, Hot-Rolled Alloy

Aliquippa,Pa. J5 ..... 6.20
Clairton,Pa. U5 ..... 6.20
Gary,Ind. U5 ..... 6.20
Houston S5 ..... 6.45
KansasCity,Mo. S5 ..... 6.45
Pittsburgh J5 ..... 6.20
Youngstown U5 ..... 6.20

BARS, C.F. Leaded Alloy (Including leaded extra)

Ambridge,Pa. W18 ....9.475
BeaverFalls,Pa. M12 ..9.475
Chicago W18 ..... 9.475
C'eveland C20 ..... 9.475
LosAngeles S30 ..... 11.10
LosAngeles P2 ..... 11.00
Monaca,Pa. S17 ..... 9.475
Newark,N.J. W18 ..... 9.65
Warren,O. C17 ..... 9.475

BARS, Cold-Finished Carbon

Ambridge,Pa. W18 ....6.85
BeaverFalls,Pa. M12,R2 6.85
Birmingham C15 ..... 7.45
Bridgeport,Conn. N19 ...7.20
Buffalo B5 ..... 6.90
Camden,N.J. P13 ..... 7.30
Carnegie,Pa. C12 ..... 6.85
Chicago W18 ..... 6.85
Cleveland A7, C20 ..... 6.85
Detroit B5, P17 ..... 7.05
Detroit R7 ..... 6.85
Donora,Pa. A7 ..... 6.85
Elyria,O. W8 ..... 6.85
FranklinPark,Ill. N5.... 6.85
Gary,Ind. U5 ..... 6.85
GreenBay,Wis. F7 ..... 6.85
Hammond,Ind. L2, M13..6.85
Hartford,Conn. R2 ..... 7.55
Harvey,Ill. B5 ..... 6.85
LosAngeles(49) S30 ....8.30
LosAngeles R2 ..... 8.75
LosAngeles P2 ..... 8.30
Mansfield,Mass. B5 ....7.40
Massillon,O. R2, R8 ....6.85
Midland,Pa. C18 ..... 6.85
Monaca,Pa. S17 ..... 6.85
Newark,N.J. W18 ..... 7.30
NewCastle,Pa.(17) B4 ..6.85
Pittsburgh J5 ..... 6.85
Plymouth,Mich. P5 ..... 7.10
Putnam,Conn. W18 ....7.40
Readville,Mass. C14 ....7.40
S.Chicago,Ill. W14 ..... 6.85
SpringCity,Pa. K3 ..... 7.30
Struthers,O. Y1 ..... 6.85
Waukegan,Ill. A7 ..... 6.85
Youngstown F3, Y1 ..... 6.85

BARS, Cold-Finished Carbon (Turned and Ground)

Cumberland,Md.(5) C19..6.10

BARS, Cold-Finished Alloy

Ambridge,Pa. W18 ..... 8.325
BeaverFalls,Pa.,M12,R2 8.325
Bethlehem,Pa. B2 ..... 8.325
Bridgeport,Conn. N19 ..8.475
Buffalo B5 ..... 8.325
Camden,N.J. P13 ..... 8.50
Canton,O. T7 ..... 8.325
Carnegie,Pa. C12 ..... 8.325
Chicago W18 ..... 8.325
Cleveland A7, C20 ..... 8.325
Detroit B5, P17 ..... 8.525
Detroit R7 ..... 8.325
Donora,Pa. A7 ..... 8.325
Elyria,O. W8 ..... 8.325
FranklinPark,Ill. N5 ..8.325
Gary,Ind. R2 ..... 8.325
GreenBay,Wis. F7 ..... 8.325
Hammond,Ind. L2, M13 8.325
Hartford,Conn. R2 ..... 8.625
Harvey,Ill. B5 ..... 8.325
Lackawanna,N.Y. B2 ..8.325
LosAngeles P2, S30 ....10.10
Mansfield,Mass. B5 ....8.625
Massillon,O. R2, R8 ....8.325
Midland,Pa. C18 ..... 8.325
Monaca,Pa. S17 ..... 8.325
Newark,N.J. W18 ..... 8.50
Plymouth,Mich. P5 ..... 8.525
S.Chicago W14 ..... 8.325
SpringCity,Pa. K3 ..... 8.50
Struthers,O. Y1 ..... 8.325
Warren,O. C17 ..... 8.325
Waukegan,Ill. A7 ..... 8.325
Worcester,Mass. A7 ....8.625
Youngstown F3, Y1 ..... 8.325

BARS, Reinforcing (To Fabricators)

Ala.City,Ala. R2 ..... 5.075
Atlanta A11 ..... 5.575
Birmingham C15 ..... 5.325
Bridgeport,Conn. N19 ..5.30
Buffalo R2 ..... 5.075
Cleveland R2 ..... 5.075
Ecorse,Mich. G5 ..... 5.425
Emeryville,Calif. J7 ....5.85
Fairfield,Ala. T2 ..... 5.075
Fairless,Pa. U5 ..... 5.225

Ft. Worth, Tex. (42) T4 .5.525
Gary, Ind. U5 .....5.075
Houston S5 .....5.325
Ind. Harbor, Ind. I-2, Y1 5.075
Johnstown, Pa. B2 ....5.075
Joliet, Ill. P22 .....5.575
KansasCity, Mo. S5 ....5.325
Lackawanna, N.Y. B2 ..5.075
LosAngeles B3 .....5.775
Milton, Pa. M18 .....5.225
Minnequa, Colo. C10 ...5.525
Niles, Calif. P1 .....5.85
Pittsburg, Calif. C11 ..5.775
Pittsburgh J5 .....5.075
Portland, Oreg. O4 .....5.85
SandSprings, Okla. S5 ..5.575
Seattle B3, N14 .....5.825
S. Chicago, Ill. R2 .....5.075
S. Duquesne, Pa. U5 ....5.075
S. SanFrancisco B3 ....5.825
SparrowsPoint, Md. B2..5.075
Sterling, Ill. (1) N15 ...5.075
Sterling, Ill. N15 .....5.175
Struthers, O. Y1 .....5.075
Torrance, Calif. C11 ...5.775
Youngstown R2, U5 ...5.075

BARS, Reinforcing (Fabricated; to Consumers)

Chicago U8 .....6.81
Cleveland U8 .....6.79
Johnstown, Pa. ¼-1" B2.6.73
KansasCity, Mo. S5 .....7.00
Marion, O. P11 .....6.70
NewYork U8 .....7.20
Pittsburgh J5, U8 .....6.75
Seattle B3, N14 .....7.20
SparrowsPt. ¼-1" B2 ..6.73
Williamsport, Pa. S19 ...6.65

RAIL STEEL BARS

ChicagoHts. (3) C2, I-2.5.075
ChicagoHts. (4) I-2 .....6.10
ChicagoHts. (4) C2 .....5.65
Ft. Worth, Tex. (26) T4..5.525
Franklin, Pa. (3) F5 .....5.10
Franklin, Pa. (4) F5 .....6.10
JerseyShore, Pa. (4) J8 ..5.50
Marion, O. (3) P11 .....5.15
Moline, Ill. (3) R2 .....5.225
Tonawanda (3) B12 ....5.65
Tonawanda (4) B12 .....6.15
Williamsport, Pa. (3) S19.5.65

BARS, Wrought Iron

Economy, Pa. (S.R.) B14 13.15
Economy, Pa. (D.R.) B14 16.35
Economy (Staybolt) B14.. 16.80
McK. Rks. (S.R.) L5 ...13.15
McK. Rks. (D.R.) L5 ...18.00
McK. Rks. (Staybolt) L5.19.15

SHEETS

SHEETS, Hot-Rolled Steel (18 Gage and Heavier)

Ala. City, Ala. R2 .....4.675
Allenport, Pa. P7 .....4.675
Ashland, Ky. (8) A10 ..4.675
Cleveland J5, R2 .....4.675
Conshohocken, Pa. A3 ..4.725
Detroit (8) M1 .....4.775
Dravosburg, Pa. U5 ....4.675
Ecorse, Mich. G5 .....4.775
Fairfield, Ala. T2 .....4.675
Fairless, Pa. U5 .....4.725
Fontana, Calif. K1 ....5.525
Gary, Ind. U5 .....4.675
Geneva, Utah C11 .....4.775
GraniteCity, Ill. (8) G4 ..4.875
Ind. Harbor, Ind. I-2, Y1 4.675
Lackawanna, N.Y. B2 ..4.675
Munhall, Pa. U5 .....4.675
Newport, Ky. (8) A2 ....4.675
Niles, O. M21 .....4.675
Pittsburg, Calif. C11 ...5.375
Pittsburgh J5 .....4.675
Portsmouth, O. P12 ....4.675
Riverdale, Ill. A1 .....4.675
Sharon, Pa. S3 .....4.675
S. Chicago, Ill. W14 ....4.675
SparrowsPoint, Md. B2..4.675
Steubenville, O. W10 ...4.675
Warren, O. R2 .....4.675
Weirton, W. Va. W6 ....4.675
Youngstown U5, Y1 ...4.675

SHEETS, H.R. (19 Ga. & Lighter)

Niles, O. M21 .....5.75

SHEETS, H.R. Alloy

Dravosburg, Pa. U5 ....7.75
Gary, Ind. U5 .....7.75
Ind. Harbor, Ind. Y1 ....7.75
Newport, Ky. A2 .....7.75
Youngstown Y1, U5 ....7.75

SHEETS, H.R. (14 Ga. & Heavier) High-Strength Low-Alloy

Cleveland J5, R2 .....6.90
Conshohocken, Pa. A3 ...6.95
Dravosburg, Pa. U5 ....6.90
Ecorse, Mich. G5 .....7.00
Fairfield, Ala. T2 .....6.90
Fairless, Pa. U5 .....6.95
Fontana, Calif. K1 .....7.75
Gary, Ind. U5 .....6.90
Ind. Harbor, Ind. I-2, Y1 6.90
Lackawanna (35) B2 ....6.90
Munhall, Pa. U5 .....6.90
Pittsburgh J5 .....6.90
S. Chicago, Ill. U5 .....6.90
SparrowsPoint (36) B2 ..6.90
Warren, O. R2 .....6.90
Weirton, W. Va. W6 ....6.90
Youngstown U5, Y1 ....6.90

SHEETS, Hot-Rolled Ingot Iron (18 Gage and Heavier)

Ashland, Ky. (8) A10 ..4.925
Cleveland R2 .....5.425
Ind. Harbor, Ind. I-2 ...4.925
Warren, O. R2 .....5.425

SHEETS, Cold-Rolled Steel (Commercial Quality)

Allenport, Pa. P7 .....5.75
Cleveland J5, R2 .....5.75
Conshohocken, Pa. A3 ...5.80
Detroit M1 .....5.75
Dravosburg, Pa. U5 ....5.75
Ecorse, Mich. G5 .....5.85
Fairfield, Ala. T2 .....5.75
Fairless, Pa. U5 .....5.80
Follansbee, W. Va. F4 ...5.75
Fontana, Calif. K1 .....7.00
Gary, Ind. U5 .....5.75
GraniteCity, Ill. G4 ....5.95
Ind. Harbor, Ind. I-2, Y1 5.75
Lackawanna, N.Y. B2 ..5.75
Mansfield, O. E6 .....5.75
Middletown, O. A10 .....5.75
Newport, Ky. A2 .....5.75
Pitsburg, Calif. C11 ....6.70
Pittsburgh J5 .....5.75
Portsmouth, O. P12 ....5.75
SparrowsPoint, Md. B2...5.75
Steubenville, O. W10 ....5.75
Warren, O. R2 .....5.75
Weirton, W. Va. W6 .....5.75
Yorkville, O. W10 .....5.75
Youngstown Y1 .....5.75

SHEETS, Cold-Rolled High-Strength, Low-Alloy

Cleveland J5, R2 ....8.525
Dravosburg, Pa. U5 ....8.525
Ecorse, Mich. G5 .....8.625
Fairless, Pa. U5 .....8.575
Fontana, Calif. K1 ....9.775
Gary, Ind. U5 .....8.525
IndianaHarbor, Ind. Y1..8.525
Lackawanna (37) B2 ...8.525
Pittsburgh J5 .....8.525
SparrowsPoint (38) B2 .8.525
Warren, O. R2 .....8.525
Weirton, W. Va. W6 ....8.525
Youngstown Y1 .....8.525

SHEETS, Cold-Rolled Ingot Iron

Cleveland R2 .....6.50
Middletown, O. A10 ....6.25
Warren, O. R2 .....6.50

SHEETS, Culvert

	Cu Steel	Cu Fe
Ashland, Ky. A10	6.65	6.90
Canton, O. R2	6.65	7.15
Dravosburg U5	6.65	6.90
Fairfield T2	6.65	6.90
Gary, Ind. U5	6.65	6.90
GraniteCity, Ill. G4	6.85	...
Ind. Harbor I-2	6.65	6.90
Kokomo, Ind. C16	6.75	...
MartinsFry. W10	6.65	...
Pittsburgh J5	6.65	...
Pitts., Calif. C11	7.40	...
SparrowsPt. B2	6 65	...

SHEETS, Culvert—Pure Iron

Ind. Harbor, Ind. I-2 ....6.90
MartinsFry., O. W10 ....6.90

SHEETS, Galvanized Steel Hot-Dipped

Ala. City, Ala. R2 .....6.30‡
Ashland, Ky. A10 .....6.30†
Canton, O. R2 .....6.30‡
Dover, O. R1 .....6.30†
Dravosburg, Pa. U5 ....6.30†
Fairfield, Ala. T2 ....6.30†
Gary, Ind. U5 .....6.30†
GraniteCity, Ill. G4 ....6.50*
Ind. Harbor, Ind. I-2 ...6.30†
Kokomo, Ind. C16 .....6.40‡
MartinsFerry, O. W10 ..6.30*
Middletown, O. A10 ....6.30†
Pittsburg, Calif. C11 ...7.05*
Pittsburgh J5 .....6.30†
SparrowsPt., Md. B2 ..6.30†
Warren, O. R2 .....6.30†
Weirton, W. Va. W6 ....6.30*

*Continuous and noncontinuous. †Continuous. ‡Noncontinuous.

SHEETS, Well Casing

Fontana, Calif. K1 ....7.025

SHEETS, Galvanized High-Strength Low-Alloy

Dravosburg, Pa. U5 ...9.275
SparrowsPoint (39) B2..9.275

SHEETS, Galvannealed Steel

Canton, O. R2 .....6.70
Dravosburg, Pa. U5 ....6.70

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland, Ky. A10 .....6.55
Middletown, O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland (28) R2 .....7.125
Niles, O. (28) R2 .....7.125
Weirton, W. Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler, Pa. A10 (type 1) 8.95
Butler, Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland, Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg, Pa. U5 ....6.325
Gary, Ind. U5 .....6.325
GraniteCity, Ill. G4 ....6.525
Ind. Harbor, Ind. I-2, Y1 6.325
Middletown, O. A10 ....6.325
Niles, O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee, W. Va. F4 ...8.35
Ind. Harbor, Ind. I-2 ...8.175
Yorkville, O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom, W. Va. W10 6.70
Gary, Ind. U5 .....6.70
Mansfield, O. E6 .....6.70
Middletown, O. A10 ....6.70
Niles, O. M21 .....6.70
Weirton, W. Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ....7.10

SHEETS, Galvanized Ingot Iron (Hot-dipped Continuous)

Ashland, Ky. A10 .....6.55
Middletown, O. A10 ....6.55

SHEETS, Electrogalvanized

Cleveland (28) R2 .....7.125
Niles, O. (28) R2 .....7.125
Weirton, W. Va. W6 ....6.975

SHEETS, Aluminum Coated

Butler, Pa. A10 (type 1) 8.95
Butler, Pa. A10 (type 2) 9.05

SHEETS, Enameling Iron

Ashland, Ky. A10 .....6.325
Cleveland R2 .....6.325
Dravosburg, Pa. U5 ....6.325
Gary, Ind. U5 .....6.325
GraniteCity, Ill. G4 ....6.525
Ind. Harbor, Ind. I-2, Y1 6.325
Middletown, O. A10 ....6.325
Niles, O. M21 .....6.325
Youngstown Y1 .....6.325

BLUED STOCK, 29 Gage

Follansbee, W. Va. F4 ...8.35
Ind. Harbor, Ind. I-2 ...8.175
Yorkville, O. W10 .....8.175

SHEETS, Long Terne Steel (Commercial Quality)

BeechBottom, W. Va. W10 6.70
Gary, Ind. U5 .....6.70
Mansfield, O. E6 .....6.70
Middletown, O. A10 ....6.70
Niles, O. M21 .....6.70
Weirton, W. Va. W6 ....6.70

SHEETS, Long Terne, Ingot Iron

Middletown, O. A10 ....7.10

Key To Producers

A1 Acme Steel Co.
A2 Acme-Newport Steel Co.
A3 Alan Wood Steel Co.
A4 Allegheny Ludlum Steel
A5 Alloy Metal Wire Div., H. K. Porter Co. Inc.
A6 American Shim Steel Co.
A7 American Steel & Wire Div., U.S. Steel Corp.
A8 Anchor Drawn Steel Co.
A9 Angell Nail & Chaplet
A10 Armco Steel Corp.
A11 Atlantic Steel Co.

B1 Babcock & Wilcox Co.
B2 Bethlehem Steel Co.
B3 Beth. Pac. Coast Steel
B4 Blair Strip Steel Co.
B5 Bliss & Laughlin Inc.
B8 Braeburn Alloy Steel
B9 Brainard Steel Div., Sharon Steel Corp.
B10 E. & G. Brooke, Wickwire Spencer Steel Div. Colo. Fuel & Iron
B11 Buffalo Bolt Co., Div., Buffalo-Eclipse Corp.
B12 Buffalo Steel Corp.
B14 A. M. Byers Co.
B15 J. Bishop & Co.

C1 Calstrip Steel Corp.
C2 Calumet Steel Div. Borg-Warner Corp.
C4 Carpenter Steel Co.
C7 Cleve. Cold Rolling Mills
C8 Cold Metal Products Co.
C9 Colonial Steel Co.
C10 Colorado Fuel & Iron
C11 Columbia-Geneva Steel
C12 Columbia Steel & Shaft.
C13 Columbia Tool Steel Co.
C14 Compressed Steel Shaft.
C15 Connors Steel Div. H. K. Porter Co. Inc.
C16 Continental Steel Corp.
C17 Copperweld Steel Co.
C18 Crucible Steel Co.
C19 Cumberland Steel Co.
C20 Cuyahoga Steel & Wire
C22 Claymont Steel Products Dept. Wickwire Spencer Steel Division
C23 Charter Wire Inc.
C24 G. O. Carlson Inc.

D2 Detroit Steel Corp.
D3 Dearborn Division Sharon Steel Corp.
D4 Disston Division, H. K. Porter Co. Inc.
D6 Driver-Harris Co.
D7 Dickson Weatherproof Nail Co.
D8 Damascus Tube Co.
D9 Wilbur B. Driver Co.

E1 EasternGas&FuelAssoc.
E2 Eastern Stainless Steel
E4 Electro Metallurgical Co.
E5 Elliott Bros. Steel Co.
E6 Empire Steel Corp.

F2 Firth Sterling Inc.
F3 Fitzsimmons Steel Co.
F4 Follansbee Steel Corp.
F5 Franklin Steel Div. Borg-Warner Corp.
F6 Fretz-Moon Tube Co.
F7 Ft. Howard Steel & Wire
F8 Ft. Wayne Metals Inc.

G4 Granite City Steel Co.
G5 Great Lakes Steel Corp.
G6 Greer Steel Co.

H1 Hanna Furnace Corp.
H7 Helical Tube Co.

I-1 Igoe Bros. Inc.
I-2 Inland Steel Co.
I-3 Interlake Iron Corp.
I-4 Ingersoll Steel Div., Borg-Warner Corp.
I-6 Ivins, E., Steel Tube
I-7 Indiana Steel & Wire Co.

J1 Jackson Iron & Steel Co.
J3 Jessop Steel Co.
J4 Johnson Steel & Wire Co.
J5 Jones & Laughlin Steel
J6 Joslyn Mfg. & Supply
J7 Judson Steel Corp.
J8 Jersey Shore Steel Co.

K1 Kaiser Steel Corp.
K2 Keokuk Electro-Metals
K3 Keystone Drawn Steel
K4 Keystone Steel & Wire
K7 Kenmore Metals Corp.

L1 Laclede Steel Co.
L2 LaSalle Steel Co.
L3 Latrobe Steel Co.
L5 Lockhart Iron & Steel
L6 Lone Star Steel Co.
L7 Lukens Steel Co.

M1 McLouth Steel Corp.
M4 Mahoning Valley Steel
M6 Mercer Pipe Div., Sawhill Tubular Products
M8 Mid-States Steel & Wire
M12 Moltrup Steel Products
M13 Monarch Steel Div., Jones & Laughlin Steel Corp.
M14 McInnes Steel Co.
M16 Md. Fine&Special. Wire
M17 Metal Forming Corp.
M18 Milton Steel Division, Merritt-Chapman & Scott
M21 Mallory-Sharon Titanium Corp.

N1 National Standard Co.
N2 National Supply Co.
N3 National Tube Div., U.S. Steel Corp.
N5 Nelsen Steel & Wire Co.
N6 New England High Carbon Wire Co.
N8 Newman-Crosby Steel
N9 Newport Steel Corp.
N14 Northwest. SteelRoll. Mill
N15 Northwestern S.&W. Co.
N19 Northeastern Steel Corp.
O4 Oregon Steel Mills

P1 Pacific States Steel Corp.
P2 Pacific Tube Co.
P4 Phoenix Iron & Steel Co. Sub. of Barium Steel Corp.
P5 Pilgrim Drawn Steel
P6 Pittsburgh Coke&Chem.
P7 Pittsburgh Steel Co.
P11 Poliak Steel Co.
P12 Portsmouth Division, Detroit Steel Corp.
P13 Precision Drawn Steel
P14 Pitts. Screw & Bolt Co.
P15 Pittsburgh Metallurgical
P16 Page Steel & Wire Div., Amer. Chain & Cable
P17 Plymouth Steel Co.
P19 Pitts. Rolling Mills
P20 Prod. Steel Strip Corp.
P22 Phoenix Mfg. Co.

R1 Reeves Steel & Mfg. Co.
R2 Republic Steel Corp.
R3 Rhode Island Steel Corp.
R5 Roebling's Sons, John A.
R6 Rome Strip Steel Co.
R7 Rotary Electric Steel Co.
R8 Reliance Div., EatonMfg.
R9 Rome Mfg. Co.
R10 Rodney Metals Inc.

S1 Seneca Wire & Mfg. Co.
S3 Sharon Steel Corp.
S4 Sharon Tube Co.
S5 Sheffield Steel Div., Armco Steel Corp.
S6 Shenango Furnace Co.
S7 Simmons Co.
S8 Simonds Saw & Steel Co.
S12 Spencer Wire Corp.
S13 Standard Forgings Corp.
S14 Standard Tube Co.
S15 Stanley Works
S17 Superior Drawn Steel Co.
S18 Superior Steel Corp.
S19 Sweet's Steel Co.
S20 Southern States Steel
S23 Superior Tube Co.
S25 Stainless Welded Prod.
S26 Specialty Wire Co. Inc.
S30 Sierra Drawn Steel Corp.
S40 Seneca Steel Service

T2 Tenn. Coal & Iron Div., U.S. Steel Corp.
T3 Tenn. Prod. & Chem.
T4 Texas Steel Co.
T5 Thomas Strip Division, Pittsburgh Steel Co.
T6 Thompson Wire Co.
T7 Timken Roller Bearing
T9 Tonawanda Iron Div., Am. Rad. & Stan. San.
T13 Tube Methods Inc.
T19 Techalloy Co. Inc.

U4 Universal-Cyclops Steel
U5 United States Steel Corp.
U6 U.S. Pipe & Foundry
U7 Ulbrich Stainless Steels
U8 U.S. Steel Supply Div., U.S. Steel Corp.

V2 Vanadium-Alloys Steel
V3 Vulcan Crucible Div., H. K. Porter Co. Inc.

W1 Wallace Barnes Co.
W2 Wallingford Steel Co.
W3 Washburn Wire Co.
W4 Washington Steel Corp.
W6 Weirton Steel Co.
W7 W. Va. Steel & Mfg. Co.
W8 Western Automatic Machine Screw Co.
W9 Wheatland Tube Co.
W10 Wheeling Steel Corp.
W12 Wickwire Spencer Steel Div., Colo. Fuel & Iron
W13 Wilson Steel & Wire Co.
W14 Wisconsin Steel Div., International Harvester
W15 Woodward Iron Co.
W18 Wyckoff Steel Co.

Y1 Youngstown Sheet&Tube

STRIP

STRIP, Hot-Rolled Carbon

Ala.City,Ala.(27) R2	4.675
Allenport,Pa. P7	4.675
Alton,Ill. L1	4.875
Ashland,Ky.(8) A10	4.675
Atlanta A11	4.875
Bessemer,Ala. T2	4.675
Birmingham C15	*4.925*
Bridgeport,Conn. N19	4.625
Buffalo(27) R2	4.675
Conshohocken,Pa. A3	4.725
Detroit M1	4.775
Ecorse,Mich. G5	4.775
Fairfield,Ala. T2	4.675
Fontana,Calif. K1	5.525
Gary,Ind. U5	4.675
Houston S5	4.925
Ind.Harbor,Ind. I-2, Y1	4.675
Johnstown,Pa.(25) B2	4.675
KansasCity,Mo. S5	4.925
Lackaw'na,N.Y.(25) B2	4.675
LosAngeles(25) B3	5.425
Minnequa,Colo. C10	5.775
Pittsburg,Calif. C11	5.425
Riverdale,Ill. A1	4.675
SanFrancisco S7	5.95
Seattle(25) B3	5.675
Seattle N14	5.675
Sharon,Pa. S3	4.675
S.Chicago,Ill. W14	4.675
S.SanFrancisco(25) B3	5.425
SparrowsPoint,Md. B2	4.675
Sterling,Ill.(1) N15	4.675
Sterling,Ill. N15	4.775
Torrance,Calif. C11	5.425
Warren,O. R2	4.675
Weirton,W.Va. W6	4.675
Youngstown U5	4.675

STRIP, Hot-Rolled Alloy

Bridgeport,Conn. N19	7.50
Carnegie,Pa. S18	7.75
Gary,Ind. U5	7.75
Ind.Harbor,Ind. Y1	7.75
LosAngeles B3	8.95
Newport,Ky. A2	7.75
Sharon,Pa. S3	7.75
S.Chicago,Ill. W14	7.75
Youngstown U5, Y1	7.75

STRIP, Hot-Rolled High-Strength, Low-Alloy

Bessemer,Ala. T2	6.95
Conshohocken,Pa. A3	6.95
Ecorse,Mich. G5	7.05
Fairfield,Ala. T2	6.95
Gary,Ind. U5	6.95
Houston S5	7.20
Ind.Harbor,Ind. I-2, Y1	6.95
KansasCity,Mo. S5	7.20
Lackawanna,N.Y. B2	6.95
LosAngeles(25) B3	7.70
Seattle(25) B3	7.95
Sharon,Pa. S3	6.95
S.SanFrancisco(25) B3	7.70
SparrowsPoint,Md. B2	6.95
Warren,O. R2	6.95
Weirton,W.Va. W6	6.95
Youngstown U5 Y1	6.95

STRIP, Hot-Rolled Ingot Iron

Ashland,Ky.(8) A10	4.925
Warren,O. R2	5.425

STRIP, Cold-Rolled Carbon

Anderson,Ind. G6	6.85
Baltimore T6	6.85
Boston T6	7.40
Buffalo S40	6.85
Cleveland A7, J5	6.85
Conshohocken,Pa. A3	6.90
Dearborn,Mich. D3	6.95
Detroit D2, M1, P20	6.95
Dover,O. G6	6.85
Ecorse,Mich. G5	6.95
Follansbee,W.Va. F4	6.85
Fontana,Calif. K1	6.70
FranklinPark,Ill. T6	6.95
Ind.Harbor,Ind. Y1	6.85
Indianapolis C8	7.00
LosAngeles C1	8.80
NewBedford,Mass. R10	7.30
NewBritain(10) S15	6.85
NewCastle,Pa. B4, E5	6.85
NewHaven,Conn. D2	7.30
NewKensington,Pa. A6	6.85
Pawtucket,R.I. R3	7.50
Pawtucket,R.I. N8	7.40
Pittsburgh J5	6.85
Riverdale,Ill. A1	6.95
Rome,N.Y.(32) R6	6.85
Sharon,Pa. S3	6.85
Trenton,N.J.(31) R5	8.30
Wallingford,Conn. W2	7.30
Warren,O. R2, T5	6.85
Weirton,W.Va. W6	6.85
Worcester,Mass. A7	7.40
Youngstown C8, Y1	6.85

STRIP, Cold-Rolled Alloy

Boston T6	14.90
Carnegie,Pa. S18	14.85
Cleveland A7	14.55
Dover,O. G6	14.55
FranklinPark,Ill. T6	14.55
Harrison,N.J. C18	14.55
Indianapolis C8	14.70
Pawtucket,R.I. N8	14.90
Sharon,Pa. S3	14.55
Worcester,Mass. A7	14.85
Youngstown C8	14.55

STRIP, Cold-Rolled High-Strength, Low-Alloy

Cleveland A7	10.00
Dearborn,Mich. D3	10.10
Dover,O. G6	10.10
Ecorse,Mich. G5	10.10
Ind.Harbor,Ind. Y1	10.20
Sharon,Pa. S3	10.00
Warren,O. R2	10.00
Weirton,W.Va. W6	10.20
Youngstown Y1	10.20

STRIP, Cold-Finished Spring Steel (Annealed)

	0.26-0.40C	0.41-0.60C	0.61-0.80C	0.81-1.05C	1.06-1.35C
Baltimore T6	8.50	10.10	12.30	15.30	18.25
Boston T6	8.50	10.10	12.30	15.30	18.25
Bristol,Conn. W1	...	...	12.30	15.30	18.25
Carnegie,Pa. S18	...	9.80	12.00	15.00	....
Cleveland A7	7.95	9.80	12.00	15.00	17.95
Cleveland C7	...	9.80	12.00	15.00	17.95
Dover,O. G6	7.95	9.80	12.00	15.00	17.95
Detroit D2	8.05	9.90	12.10	15.10	....
Dearborn,Mich. D3	8.05	9.90	12.10	....	....
FranklinPark,Ill. T6	8.05	9.80	12.00	15.00	17.95
Harrison,N.J. C18	...	...	12.30	15.30	18.25
Indianapolis C8	8.10	9.95	12.00	15.00	17.95
NewBritain,Conn.(10) S15	7.95	9.80	12.00	15.00	17.95
NewCastle,Pa. B4, E5	7.95	9.80	12.00	15.00	....
NewHaven,Conn. D2	8.40	10.10	12.30	15.30	....
NewKensington,Pa. A6	7.95	9.80	12.00	15.00	....
NewYork W3	...	10.10	12.30	15.30	18.25
Pawtucket,R.I. N8	8.50	10.10	12.30	15.30	18.25
Riverdale,Ill. A1	8.05	9.80	12.00	15.00	17.95
Rome,N.Y.(32) R6	7.95	9.80	12.00	15.00	17.95
Sharon,Pa. S3	7.95	9.80	12.00	15.00	17.95
Trenton,N.J. R5	...	10.10	12.30	15.30	18.25
Wallingford,Conn. W2	8.40	10.10	12.30	15.30	18.15
Warren,O. T5	7.95	9.80	12.00	15.00	17.95
Weirton,W.Va. W6	7.95	9.80	12.00	15.00	17.95
Worcester,Mass. A7, T6	8.50	10.10	12.30	15.30	18.25
Youngstown C8	7.95	9.80	12.00	15.00	17.95

Spring Steel (Tempered)

	Up to 0.80C	0.81-1.05C	1.06-1.35C
Bristol,Conn. W1	16.80	20.65	....
Buffalo W12	16.80	....	....
FranklinPark,Ill. T6	17.15	21.00	25.35
Harrison,N.J. C18	16.80	20.65	25.00
NewYork W3	16.80	20.65	25.00
Palmer,Mass. W12	16.80	....	....
Trenton,N.J. R5	16.80	20.65	25.00
Worcester,Mass. A7, T6	16.80	20.65	25.00
Youngstown C8	17.15	21.00	25.35

STRIP, Cold-Rolled Ingot Iron

Warren,O. R2	7.60

STRIP, C.R. Electrogalvanized

Cleveland A7	6.85*
Dover,O. G6	6.85*
Riverdale,Ill. A1	6.95*
Warren,O. B9, T5	6.85*
Worcester,Mass. A7	7.40*
Youngstown C8	6.85*

*Plus galvanizing extras.

STRIP, Galvanized (Continuous)

Sharon,Pa. S3	6.975

TIGHT COOPERAGE HOOP

Atlanta A11	5.40
Riverdale,Ill. A1	5.25
Sharon,Pa. S3	5.10
Youngstown U5	5.10

SILICON STEEL

H.R. SHEETS(22 Ga., cut lengths)	Field	Armature	Electric	Motor	Dynamo
BeechBottom,W.Va. W10	...	....	11.00	12.05	13.05
Brackenridge,Pa. A4	...	....	11.00	12.50	13.05
Mansfield,O. E6	9.20	10.35	11.00	12.05	13.05
Newport,Ky. A2	9.20	10.35	11.00	12.05	13.05
Niles,O. M21	9.20	10.35	11.00	12.05	....
Vandergrift,Pa. U5	...	10.35	11.00	12.05	13.05
Warren,O. R2	9.20	10.35	11.00	12.05	....
Zanesville,O. A10	...	10.35	11.00	12.05	13.05
Zanesville,O. A10 (FP coils)	...	10.85	11.525	12.575	13.55
Zanesville,O. A10 (SP coils)	...	....	11.025	12.075	13.05

C.R. COILS & CUT LENGTHS (22 Ga.)

Fully Processed (Semiprocessed ½c lower)	Field	Armature	Electric	Motor	Dynamo
Brackenridge,Pa. A4	....	....	11.525	12.575	13.55
GraniteCity,Ill. G4	9.40*	10.55*	11.225*	12.275*	....
IndianaHarbor,Ind. I-2	9.20†	10.35*	11.025*	12.075*	....
Mansfield,O. E6	9.70	10.85	11.525	12.575	13.55
Vandergrift,Pa. U5	9.20*	10.35*	11.025*	12.075*	13.05*
Vandergrift,Pa. U5	....	10.85†	11.525†	12.575†	13.55†
Warren,O. R2	9.20*	10.85	11.525	12.575	13.55

H.R. SHEETS (22 Ga., cut lengths)	Transformer Grades T-72	T-65	T-58	T-52
BeechBottom,W.Va. W10	14.05	14.60	15.10	16.15
Brackenridge,Pa. A4	14.05	....	....	....
Vandergrift,Pa. U5	14.05	14.60	15.10	16.15
Zanesville,O. A10	14.05	14.60	15.10	16.15

C.R. COILS & CUT LENGTHS (22 Ga.)	Grain Oriented T-100	T-90	T-80	T-73	T-66	T-72
Brackenridge,Pa. A4	....	16.90	18.50	19.00	19.50	14.05**
Butler,Pa. A10	....	....	18.50	19.00	19.50	....
Vandergrift,Pa. U5	15.90	16.90	18.50	19.00	19.50	14.55**
Warren,O. R2	....	....	....	....	....	14.55‡

*Semiprocessed. †Fully processed only. ‡Coils, annealed, semiprocessed ½c lower. **Cut lengths, ¾-cent lower.

TIN MILL PRODUCTS

TIN PLATE, Electrolytic (Base Box)	0.25 lb	0.50 lb	0.75 lb
Aliquippa, Pa. J5	$8.40	$8.65	$9.05
Dravosburg,Pa. U5	8.40	8.65	9.05
Fairfield,Ala. T2	8.50	8.75	9.15
Fairless,Pa. U5	8.50	8.75	9.15
Fontana,Calif. K1	9.15	9.40	9.80
Gary,Ind. U5	8.40	8.65	9.05
GraniteCity,Ill. G4	8.50	8.75	9.15
IndianaHarbor,Ind. I-2, Y1	8.40	8.65	9.05
Niles,O. R2	8.40	8.65	9.05
Pittsburg,Calif. C11	9.15	9.40	9.80
SparrowsPoint,Md. B2	8.50	8.75	9.15
Weirton,W.Va. W6	8.40	8.65	9.05
Yorkville,O. W10	8.40	8.65	9.05

ELECTROTIN (22-27 Gage; Dollars per 100 lb)

Aliquippa,Pa. J5	7.425	7.625	....
Niles,O. R2	7.425	7.625	7.925

TINPLATE, American	1.25 lb	1.50 lb
Aliquippa,Pa. J5	$9.70	$9.95
Dravosburg,Pa. U5	9.70	9.95
Fairfield,Ala. T2	9.80	10.05
Fairless,Pa. U5	9.80	10.05
Fontana,Calif. K1	10.45	10.70
Gary,Ind. U5	9.70	9.95
Pitts.,Calif. C11	10.45	10.70
Sp.Pt.,Md. B2	9.80	10.05
Weirton,W.Va. W6	9.70	9.95
Yorkville,O. W10	9.70	9.95

BLACK PLATE (Base Box)

Aliquippa,Pa. J5	$7.50
Dravosburg,Pa. U5	7.50
Fairfield,Ala. T2	7.60
Fairless,Pa. U5	7.60
Fontana,Calif. K1	8.25
Gary,Ind. U5	7.50
GraniteCity,Ill. G4	7.60
Ind.Harbor,Ind. I-2, Y1	7.50
Niles,O. R2	7.50
Pittsburg,Calif. C11	8.25
SparrowsPoint,Md. B2	7.60
Weirton,W.Va. W6	7.50
Yorkville,O. W10	7.50

HOLLOWARE ENAMELING Black Plate (29 Gage)

Aliquippa,Pa. J5	$7.15
Dravosburg,Pa. U5	7.15
Gary,Ind. U5	7.15
GraniteCity,Ill. G4	7.25
Ind.Harbor,Ind. Y1	7.15
Yorkville,O. W10	7.15

MANUFACTURING TERNES (Special Coated; Base Box)

Dravosburg,Pa. U5	$9.20
Gary,Ind. U5	9.20

ROOFING SHORT TERNES (8 lb Coated; Base Box)

Gary,Ind. U5	$10.75

WIRE

WIRE, Manufacturers Bright, Low Carbon

AlabamaCity,Ala. R2	7.20
Aliquippa,Pa. J5	7.20
Alton,Ill. L1	7.40
Atlanta A11	7.40
Bartonville,Ill. K4	7.30
Buffalo W12	7.20
Chicago W13	7.20
Cleveland A7, C20	7.20
Crawfordsville,Ind. M8	7.30
Donora,Pa. A7	7.20
Duluth A7	7.20
Fairfield,Ala. T2	7.20
Fostoria,O.(24) S1	7.30
Houston S5	7.45
Jacksonville,Fla. M8	7.55
Johnstown,Pa. B2	7.20
Joliet,Ill. A7	7.20
KansasCity,Mo. S5	7.45
Kokomo,Ind. C16	7.30
LosAngeles B3	8.15
Minnequa,Colo. C10	7.45
Monessen,Pa. P7, P16	7.20
N.Tonawanda,N.Y. B11	7.20
Palmer,Mass. W12	7.50
Pittsburg,Calif. C11	8.15
Portsmouth,O. P12	7.20
Rankin,Pa. A7	7.20
S.Chicago,Ill. R2	7.20
S.SanFrancisco C10	8.15
SparrowsPoint,Md. B2	7.30
Sterling,Ill.(1) N15	7.20
Sterling,Ill. N15	7.30
Struthers,O. Y1	7.20
Waukegan,Ill. A7	7.20
Worcester,Mass. A7	7.50

WIRE, Gal'd ACSR for Cores

Bartonville,Ill. K4	11.75
Buffalo W12	11.75
Cleveland A7	11.75
Donora,Pa. A7	11.75
Duluth A7	11.75
Johnstown,Pa. B2	11.75
Minnequa,Colo. C10	11.875
Monessen,Pa. P16	11.75
Muncie,Ind. I-7	11.95
NewHaven,Conn. A7	12.05
Palmer,Mass. W12	12.05
Pittsburg,Calif. C11	12.55
Portsmouth,O. P12	11.75
Roebling,N.J. R5	12.05
SparrowsPt.,Md. B2	11.85
Struthers,O. Y1	11.75
Trenton,N.J. A7	12.05
Waukegan,Ill. A7	11.75
Worcester,Mass. A7	12.05

ROPE WIRE (A)

Bartonville,Ill. K4	11.55
Buffalo W12	11.55
Fostoria,O. S1	11.55
Johnstown,Pa. B2	11.55
Monessen,Pa. P7, P16	11.55
Muncie,Ind. I-7	11.75
Palmer,Mass. W12	11.85
Portsmouth,O. P12	11.55
Roebling,N.J. R5	11.85
SparrowsPt.,Md. B2	11.65
Struthers,O. Y1	11.55
Worcester,Mass. J4	11.85

(A) Plow and Mild Plow; add 0.25c for Improved Plow

WIRE, Upholstery Spring

Aliquippa,Pa. J5	8.40
Alton,Ill. L1	8.60
Buffalo W12	8.40
Cleveland A7	8.40
Donora,Pa. A7	8.40
Duluth A7	8.40
Johnstown,Pa. B2	8.40
KansasCity,Mo. S5	8.65
LosAngeles B3	9.35
Minnequa,Colo. C10	8.60
Monessen,Pa. P7, P16	8.40
NewHaven,Conn. A7	8.70
Palmer,Mass. W12	8.70
Pittsburg,Calif. C11	9.35
Portsmouth,O. P12	8.40
Roebling,N.J. R5	8.70
S.Chicago,Ill. R2	8.40
S.SanFrancisco C10	9.35
SparrowsPoint,Md. B2	8.50
Struthers,O. Y1	8.40
Trenton,N.J. A7	8.70
Waukegan,Ill. A7	8.40
Worcester,Mass. A7	8.70

WIRE, MB Spring, High Carbon

Aliquippa,Pa. J5	8.725
Alton,Ill. L1	8.925
Bartonville,Ill. K4	8.825
Buffalo W12	8.725
Cleveland A7	8.725
Donora,Pa. A7	8.725
Duluth A7	8.725
Fostoria,O. S1	8.775
Johnstown,Pa. B2	8.725
LosAngeles B3	9.675
Milbury,Mass.(12) N6	9.025
Minnequa,Colo. C10	8.975
Monessen,Pa. P7, P16	8.725
Muncie,Ind. I-7	8.925
Palmer,Mass. W12	9.025
Pittsburg,Calif. C11	9.675
Portsmouth,O. P12	8.725
Roebling,N.J. R5	9.025
S.Chicago,Ill. R2	8.725
S.SanFrancisco C10	9.675
SparrowsPt.,Md. B2	8.825
Struthers,O. Y1	8.725
Trenton,N.J. A7	9.025
Waukegan,Ill. A7	8.725
Worcester A7, J4, T6	9.025

WIRE, Fine & Weaving(8" Coils)

Alton,Ill. L1	14.35
Bartonville,Ill. K4	14.25
Buffalo W12	14.15
Chicago W13	14.15
Cleveland A7	14.15
Crawfordsville,Ind. M8	14.25
Fostoria,O. S1	14.15
Jacksonville,Fla. M8	14.50
Johnstown,Pa. B2	14.15
Kokomo,Ind. C16	14.15
Minnequa,Colo. C10	13.90
Monessen,Pa. P6	14.15
Muncie,Ind. I-7	14.35
Palmer,Mass. W12	14.45
Roebling,N.J. C10	14.45
S.SanFrancisco C10	14.50
Waukegan,Ill A7	14.15
Worcester,Mass. A7, T6	14.45

WIRE

WIRE, Tire Bead

Bartonville,Ill. K4	....15.25
Monessen,Pa. P16	....15.45
Roebling,N.J. R5	....15.60

WIRE, Cold-Rolled Flat

Anderson,Ind. G6	....10.75
Baltimore T6	....11.05
Boston T6	....11.05
Buffalo W12	....10.75
Cleveland A7	....10.75
Crawfordsville,Ind. M8	10.75
Dover,O. G6	....10.75
Fostoria,O. S1	....10.75
FranklinPark,Ill. T6	..10.85
Kokomo,Ind. C16	....10.75
Massillon,O. R8	....10.75
Milwaukee C23	....10.95
Monessen,Pa. P7, P16	10.75
NewKensington,Pa. A6	10.75
Palmer,Mass. W12	....11.05
Pawtucket,R.I. N8	....11.05
Riverdale,Ill. A1	....10.85
Rome,N.Y. R6	....10.75
Trenton,N.J. R5	....11.05
Worcester,Mass. A7, T6	11.05

NAILS & POLISHED STAPLES,

Stock	Col.
AlabamaCity,Ala. R2	..164
Aliquippa,Pa. J5	164
Atlanta A11	166
Bartonville,Ill. K4	166
Crawfordsville,Ind. M8	.166
Donora,Pa. A7	164
Duluth A7	164
Fairfield,Ala. T2	164
Houston,Tex. S5	169
Jack'ville,Fla. (20) M8	.175
Johnstown,Pa. B2	164
Joliet,Ill. A7	164
KansasCity,Mo. S5	169
Kokomo,Ind. C16	166
Minnequa,Colo. C10	160
Monessen,Pa. P7	164
Pittsburg,Calif. C11	183
Rankin,Pa. A7	164
S.Chicago,Ill. R2	164
SparrowsPt.,Md. B2	166
Sterling,Ill. (1) N15	164
Worcester,Mass. A7	170

NAILS, Stock **Col.**

Chicago (7) W13	164
Cleveland (7) A9	170

(To Wholesalers; per cwt)

Galveston,Tex. D7	....$8.75

NAILS, Cut (100 lb keg)
To Dealers (33)

Conshohocken,Pa. A3	..$9.80
Wheeling,W.Va. W10	..9.80

TIE WIRE, Automatic Baler (14½ Ga.)(Per 97 lb Net Box)

Coil No. 3150	
AlabamaCity,Ala. R2	..$9.53
Atlanta A11	....9.63
Bartonville,Ill. K4	....9.63
Buffalo W12	....10.05
Chicago W13	....9.53
Crawfordsville,Ind. M8	..9.63
Donora,Pa. A7	....9.53
Duluth A7	....9.53
Fairfield,Ala. T2	....9.53
Houston S5	....9.78
Jack'ville,Fla. M8	....10.09
Johnstown,Pa. B2	....9.53
Joliet,Ill. A7	....9.53
KansasCity,Mo. S5	....9.78
Kokomo,Ind. C16	....9.63
LosAngeles B3	....10.32
Minnequa,Colo. C10	....9.78
Pittsburg,Calif. C11	....10.31
S.Chicago,Ill. R2	....9.53
S.SanFrancisco C10	....10.31
SparrowsPt.,Md. B2	....9.63
Sterling,Ill.(1) N15	....9.53

Coil No. 6500 Stand.	
AlabamaCity,Ala. R2	..$9.85
Atlanta A11	....9.95
Bartonville,Ill. K4	....9.95
Buffalo W12	....10.35
Chicago W13	....9.85
Crawfordsville,Ind. M8	..9.95
Donora,Pa. A7	....9.85
Duluth A7	....9.85
Fairfield,Ala. T2	....9.85
Houston S5	....10.10
Kokomo,Ind. C16	....9.95
Jacksonville,Fla. M8	....10.41
Johnstown,Pa. B2	....9.85
Joliet,Ill. A7	....9.85
KansasCity,Mo. S5	....10.10
Kokomo,Ind. C16	....10.45
LosAngeles B3	....10.65
Minnequa,Colo. C10	....10.10
Pittsburg,Calif. C11	....10.65
S.Chicago,Ill. R2	....9.85
S.SanFrancisco C10	....10.65
SparrowsPt.,Md. B2	....9.95
Sterling,Ill.(1) N15	....9.85

Coil Interim	
AlabamaCity,Ala. R2	..$9.90
Atlanta A11	....10.00
Bartonville,Ill. K4	....10.00
Buffalo W12	....10.40
Chicago W13	....9.90
Crawfordsville,Ind. M8	..10.00
Donora,Pa. A7	....9.90
Duluth A7	....9.90
Fairfield,Ala. T2	....9.91
Houston S5	....10.15
Jacksonville,Fla. M8	..10.46
Johnstown,Pa. B2	....9.90
Joliet,Ill. A7	....9.90
KansasCity,Mo. S5	....10.15
Kokomo,Ind. C16	....10.00
LosAngeles B3	....10.70
Minnequa,Colo. C10	....10.15
Pittsburg,Calif. C11	..10.70
S.Chicago,Ill. R2	....9.90
S.SanFrancisco C10	..10.70
SparrowsPt.,Md. B2	..10.00
Sterling,Ill.(1) N15	....9.90

WIRE, Barbed **Col.**

AlabamaCity,Ala. R2	..184**
Aliquippa,Pa. J5	....181§
Atlanta A11	....190*
Bartonville,Ill. K4	190
Crawfordsville,Ind. M8	..190
Donora,Pa. A7	....184†
Duluth A7	....184†
Fairfield,Ala. T2	....184†
Houston,Tex. S5	....189**
Jacksonville,Fla. M8	195
Johnstown,Pa. B2	....188*
Joliet,Ill. A7	....184†
KansasCity,Mo. S5	....189**
Kokomo,Ind. C16	....186†
Minnequa,Colo. C10	....189**
Monessen,Pa. P7	....188*
Pittsburg,Calif. C11	...204†
Rankin,Pa. A7	....184†
S.Chicago,Ill. R2	....184**
S.SanFrancisco C10	...207**
SparrowsPoint,Md. B2	190*
Sterling,Ill.(1) N15	....188*

WOVEN FENCE, 9-15 Ga. Col.

Ala.City,Ala. R2	....176**
Aliq'ppa,Pa. 9-14½ga. J5	179§
Atlanta A11	....182*
Bartonville,Ill. K4	182
Crawfordsville,Ind. M8	..182
Donora,Pa. A7	....176†
Duluth A7	....176†
Fairfield,Ala. T2	....176†
Houston,Tex. S5	....181**
Jacksonville,Fla. M8	187
Johnstown,Pa.(43) B2	..180*
Joliet,Ill. A7	....176†
KansasCity,Mo. S5	..181**
Kokomo,Ind. C16	....178†
Minnequa,Colo. C10	..181**
Monessen,Pa. 9 ga. P7	..180*
Pittsburg,Calif. C11	..199†
Rankin,Pa. A7	....176†
S.Chicago,Ill. R2	....176**
Sterling,Ill.(1) N15	....180*

	An'ld	Galv.
WIRE (16 gage)	**Stone**	**Stone**
Ala.City,Ala.R2	15.70	17.25**
Aliq'ppa,Pa. J5	..15.70	17.50
Bartonville K4	..15.80	17.75
Buffalo W12	....16.10	....
Cleveland A7	....15.70	....
Crawf'dsville M8	15.80	17.75
Fostoria,O. S1	..16.20	17.75†
Houston S5	...15.95	17.50**
Jacksonville M8	..16.05	18.00
Johnstown B2	..15.70	17.65*
Kan.City,Mo.S5	15.95	17.50**
Kokomo C16	...15.80	17.35†
Minnequa C10	..16.05	17.75**
P'lm'r,Mass.W2	16.10	17.65*
Pitts.,Calif. C11	16.05	17.60†
SparrowsPt. B2	15.80	17.75*
Sterling(1) N15	16.10	18.05*
Waukegan A7	..15.70	17.25†
Worcester A7	....16.00	....

WIRE, Merchant Quality		
(6 ½ to 8 gage)	**An'ld**	**Galv.**
Ala.City,Ala. R2	7.95	8.35**
Aliquippa J5	....7.95	8.475§
Atlanta (48) A11	8.05	8.65*
Bartonville(48) K4.	8.05	8.65
Buffalo W12	....8.10	8.50†
Cleveland A7	....7.95	....
Crawfordsville M8	.8.05	8.65
Donora,Pa. A7	..7.95	8.35†
Duluth A7	....7.95	8.35†
Fairfield T2	....7.95	8.35†
Houston(48) S5	.8.20	8.60**
Jacks'ville,Fla. M8	8.30	8.90
Johnstown B2(48)	7.95	8.55*
Joliet,Ill. A7	....7.95	8.35†
Kans.City(48) S5	8.20	8.60**
Kokomo C16	....8.05	8.45†
LosAngeles B3	...8.90	9.50*
Minnequa, C10	..8.20	8.60**
Monessen P7 (48)	7.95	8.55*
Palmer,Mass. W12	8.40	8.80†
Pitts.,Calif. C11	.8.90	9.30†
Portsmouth,O. P12	7.95	....
Rankin,Pa. A7	...7.95	8.35†
S.Chicago R2	...7.95	8.35**
S.SanFran. C10	8.90	9.30**
Spar'wsPt. B2(48)	8.05	8.65*
Sterling(1)(48)N15	7.95	8.55*
Struth'rs,O.(48)Y1	7.95	8.45‡
Worcester,Mass.A7	8.25	8.65†

Based on zinc price of: *13.50c. †5c. §10c. ‡Less than 10. ††13c. **Subject to zinc equalization extras.

BALE TIES, Single Loop **Col.**

AlabamaCity,Ala. R2	..190
Atlanta A11	192
Bartonville,Ill. K4	192
Crawfordsville,Ind. M8	..192
Donora,Pa. A7	190
Duluth A7	190
Fairfield,Ala. T2	190
Houston S5	195
Jacksonville,Fla. M8	197
Joliet,Ill. A7	190
KansasCity,Mo. S5	195
Kokomo,Ind. C16	192
Minnequa,Colo. C10	195
Pitts.,Calif. C11	214
S.Chicago,Ill. R2	190
S.SanFrancisco C10	214
Sterling,Ill. N15	190
SparrowsPoint,Md. B2	..192
Tonawanda,N.Y. B12	...169
Williamsport,Pa. S19	175

FENCE POSTS

ChicagoHts.,Ill. C2, I-2	.167
Duluth A7	167
Franklin,Pa. F5	167
Huntington,W.Va. W7	..169
Johnstown,Pa. B2	167
Marion,O. P11	167
Minnequa,Colo. C10	172
Sterling,Ill. N15	169
Tonawanda,N.Y. B12	169
Williamsport,Pa. S19	175

FASTENERS

(Base discounts, full container quantity, per cent off list, f.o.b. mill)

BOLTS

Carriage, Machine Bolts

Full Size Body (cut thread)

½ in. and smaller;

6 in. and shorter..	55
Longer than 6 in. ..	46.5

⅝ in. thru 1 in.:

6 in. and shorter ..	46.5
Longer than 6 in. ..	44

1⅛ in. and larger:

All lengths	44

Undersized Body (rolled thread)

½ in. and smaler:	
6 in. and shorter ..	55

Carriage, Machine, Lag Bolts
Hot Galvanized:

½ in. and smaller:

6 in. and shorter ..	35
Longer than 6 in. ..	23

⅝ in. thru 1 in.:

6 in. and shorter ..	20
Longer than 6 in. ..	20

1⅛ in. and larger:

All lengths	 20

Lag Bolts

All diameters:

6 in. and shorter	55
Longer than 6 in. ..	47

Plow and Tap Bolts

½ in. and smaller by 6 in. and shorter 54

Larger than ½ in. or longer than 6 in. 47

Blank Bolts 47

Step, Elevator, Tire Bolts 54

NUTS

Reg. & Heavy Square Nuts:

All sizes	 59

Square Nuts, Reg. & Heavy, Hot Galvanized:

All sizes	 45

Hex Nuts, Reg. & Heavy, Hot Pressed:

⅜ in. and smaller .	63
⅞ in. to 1 in., incl.	59.5
1⅛ in. to 1½ in., incl.	64
1⅝ in. and larger ..	58

Hex Nuts, Reg. & Heavy, Cold Punched:

⅜ in. and smaller..	63
⅞ in. to 1½ in., incl.	59.5
1⅝ in. and larger .	58

Hex Nuts, All Types, Hot Galvanized:

⅜ in. and smaller..	50
⅞ in. to 1 in., incl.	46
1⅛ in. to 1½ in., incl.	51

Hex Nuts, Semifinished, Reg. & Heavy (Incl. Slotted):

⅜ in. and smaller..	63
⅞ in. to 1½ in., incl.	59.5
1⅝ in. and larger ..	58

Hex Nuts, Finished (Incl. Slotted and Castellated):

1 in. and smaller ..	65
1⅛ in. to 1½ in., incl.	62
1⅝ in. and larger..	58

CAP AND SET SCREWS

(Base discounts, packages, per cent off list, f.o.b. mill)

Hex Head Cap Screws, Coarse or Fine Thread, Bright:

6 in. and shorter:

½ in. and smaller..	47
⅝, ⅞ and 1 in. diam.	31

Longer than 6 in.:

½ in. and smaller..	18.5
⅝, ⅞ and 1 in. diam.	5.5

High Carbon, Heat Treated:

6 in. and shorter:

½ in. and smaller..	34
⅝, ⅞ and 1 in. diam.	13

Longer than 6 in.:

½ in. and smaller	+1
⅝, ⅞ and 1 in. diam.	+19

Fillister Head, Coarse Thread:
Listed Sizes ..... +31

Flat Head, Coarse Thread:
¼ in. and smaller by 6 in. and shorter..+57

Set Screws, Square Head, Cup Point, Coarse Thread:

Through 1 in. diam.:

6 in. and shorter ..	11
Longer than 6 in. ..	+10

RIVETS

F.o.b. Cleveland and/or freight equalized with Pittsburgh, f.o.b. Chicago and/or freight equalized with Birmingham except where equalization is too great.

Structural ½-in., larger 10.85
1/16-in. under List less 26.5%

BOILER TUBES

Net base c.l. prices, dollars per 100 ft, mill; minimum wall thickness, cut lengths 10 to 24 ft, inclusive.

O.D. In.	B.W. Gage	Seamless H.R.	Seamless C.D.	Elec. Weld H.R.
1	13	....	23.56	22.84
1¼	13	....	27.92	22.85
1½	13	26.34	30.86	25.08
1¾	13	31.12	36.45	29.64
2	13	34.85	40.85	33.21
2¼	13	39.29	46.01	37.42
2½	12	42.64	49.94	40.61
2½	12	46.96	55.01	44.73
2¾	12	50.86	59.57	48.44
3	12	54.24	63.53	51.66

RAILWAY MATERIALS

	Standard No. 1	Standard No. 2	Tee Rails All No. 2	Tee Rails 60 lb Under
RAILS				
Bessemer,Pa. U5	5.075	4.975	5.025	6.00
Ensley,Ala. T2	5.075	4.975	....	6.00
Fairfield, Ala. T2	....	....	....	6.00
Gary,Ind. U5	5.075	4.975	5.025	....
Huntington,W.Va. W7	....	....	....	*6.00*
IndianaHarbor,Ind. I-2	5.075	4.975	5.025	....
Johnstown,Pa. B2	....	....	...(16)	6.00
Lackawanna,N.Y. B2	5.075	4.975	....	6.00
Minnequa,Colo. C10	5.075	4.975	....	6.50
Steelton,Pa. B2	5.075	4.975	....	....
Williamsport,Pa. S19	....	....	....	6.15

TIE PLATES

Fairfield,Ala. T2	....6.025
Gary,Ind. U5	....6.025
Ind.Harbor,Ind. I-2	....6.025
Lackawanna,N.Y. B2	..6.025
Minnequa,Colo. C10	....6.025
Seattle B3	....6.175
Steelton,Pa. B2	....6.025
Torrance,Calif. C11	...6.175

JOINT BARS

Bessmer,Pa. U5	....6.35
Fairfield,Ala. T2	....6.35
Ind.Harbor,Ind. I-2	....6.35
Joliet,Ill. U5	....6.35
Lackawanna,N.Y. B2	..6.35
Minnequa,Colo. C10	....6.35
Steelton,Pa. B2	....6.35

AXLES

Ind.Harbor,Ind. S13	....8.10
Johnstown,Pa. B2	....8.10

TRACK BOLTS, Untreated

Cleveland R2	....13.10
Lebanon,Pa. B2	....13.10
Minnequa,Colo. C10	...13.10
Pittsburgh P14	....13.10
Seattle B3	....13.60

SCREW SPIKES

Cleveland R2	....12.85
Pittsburgh P14	....12.85

STANDARD TRACK SPIKES

Fairfield,Ala. T2	....8.775
Ind.Harbor,Ind. I-2, Y1	8.775
KansasCity,Mo. S5	....8.775
Lebanon,Pa. B2	....8.775
Minnequa,Colo. C10	....8.775
Pittsburgh J5	....8.775
Seattle B3	....9.275
S.Chicago,Ill. R2	....8.775
Struthers,O. Y1	....8.775
Youngstown R2	....8.775

Footnotes

(1) Chicago base.
(2) Angles, flats, bands.
(3) Merchant.
(4) Reinforcing.
(5) 1⅛ to under 1 7/16 in.; 1 7/16 to under 1 5/16 in.; 6.25c; 1 15/16 to 3 in.; inclusive, 6.60c.
(6) Chicago or Birm. base.
(7) To jobbers, 3 cols. lower.
(8) 16 Ga. and heavier.
(9) Merchant quality; add 0.35c for special quality.
(10) Pittsburgh base.
(11) Cleveland & Pitts. base.
(12) Worcester, Mass., base.
(13) Add 0.35c for 17 Ga. & heavier.
(14) Gage 0.143 to 0.249 in.; for gage 0.142 and lighter, 5.80c.
(15) ⅜" and thinner.
(16) 40 lb and under.
(17) Flats only; 0.25 in. & heavier.
(18) To dealers.
(19) Chicago & Pitts. base.
(20) Plus 1c per 100 lb.
(21) New Haven, Conn., base.
(22) Deld. San Francisco Bay area.
(23) Special quality.
(24) Deduct 0.05c, finer than 15 Ga.
(25) Bar mill bands.
(26) Delivered in mill zone, 5.635c.
(27) Bar mill sizes.
(28) Bonderized.
(29) Youngstown base.
(30) Sheared; for universal mill add 0.45c.
(31) Widths over ⅝-in.; 7.30c, for widths ⅝-in and under by 0.125 in. and thinner.
(32) Buffalo base.
(33) To jobbers, deduct 20c.
(34) 9.60c for cut lengths.
(35) 72" and narrower.
(36) 54" and narrower.
(38) 14 Ga. & lighter; 48" & narrower.
(39) 48" and narrower.
(40) Lighter than 0.035"; 0.035" and heavier, 0.35c higher.
(41) 9.10c for cut lengths.
(42) Mill lengths, f.o.b. mill; deld. in mill zone or within switching limits, 5.685c.
(43) 9-14½ Ga.
(48) 6-7 Ga.
(49) 3½in. and smaller rounds; 8.65c, over 3½-in. and other shapes.

SEAMLESS STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	2		2½		3		3½		4		5		6	
List Per Ft.	37c		58.5c		76.5c		92c		$1.09		$1.48		$1.92	
Pounds Per Ft	3.68		5.82		7.62		9.20		10.89		14.81		19.18	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Ambridge, Pa. N2	+2	....	4.5	....	7	....	8.5	....	8.5	....	8.25	....	10.75	....
Lorain, O. N3	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8
Youngstown Y1	0.5	+17.5	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

ELECTRIC WELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Youngstown R2	+2	+20	4.5	+14.25	7	+11.75	8.5	+10.25	8.5	+10.25	8.25	+10.5	10.75	+8

BUTTWELD STANDARD PIPE, Threaded and Coupled

Carload discounts from list, %

Size—Inches	⅛		¼		⅜		½		¾		1		1¼	
List Per Ft	5.5c		6c		6c		8.5c		11.5c		17c		23c	
Pounds Per Ft	0.24		0.42		0.57		0.85		1.13		1.68		2.28	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Alton, Ill. L1	....	....	....	....	....	....	10.5	+3.75	13.5	+4.75	16	+1.25	18.5	0.5
Benwood, W. Va. W10	10	+20.5	+0.25	+27.75	+9.75	+37.25	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Butler, Pa. P6	10	+20.5	0.5	+27	+8.5	+36	....	....	....	....	....	....	....	....
Etna, Pa. N2	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Fairless, Pa. N3	....	....	....	....	....	....	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Fontana, Calif. K1	....	....	....	....	....	....	+0.5	+19.75	2.5	+15.75	5	+12.5	7.5	+10.5
Indiana Harbor, Ind. Y1	....	....	....	....	....	....	11.5	+7.75	14.5	+3.75	17	+0.25	19.5	1.5
Lorain, O. N3	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sharon, Pa. S4	11	+19.5	1.5	+26	+7.5	+35	....	....	....	....	....	....	....	....
Sharon, Pa. M6	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Sparrows Pt., Md. B2	9	+21.5	0.5	+28	+9.5	+37	10.5	+8.75	13.5	+4.75	16	+1.25	18.5	0.5
Wheatland, Pa. W9	11	+19.5	1.5	+26	+7.5	+35	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5
Youngstown R2, Y1	....	....	....	....	....	....	12.5	+6.75	15.5	+2.75	18	0.75	20.5	2.5

Size—Inches	1½		2		2½		3		3½		4	
List Per Ft	27.5c		37c		58.5c		76.5c		92c		$1.09	
Pounds Per Ft	2.73		3.65		5.82		7.62		9.20		10.89	
	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*	Blk	Galv*
Aliquippa, Pa. J5	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Alton, Ill. L1	19	1.5	19.5	2	21	2.75	21	2.75	....	....	....	....
Benwood, W. Va. W10	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+0.75	13.5	+5.25
Etna, Pa. N2	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+5.25	13.5	+5.25
Fairless, Pa. N3	19	1.5	19.5	2	21	2.75	21	2.75	11.5	+7.25	11.5	+7.25
Fontana, Calif. K1	8	+9.5	8.5	+9	10	+8.25	10	+8.25	0.5	+18.25	0.5	+18.25
Indiana Harbor, Ind. Y1	20	2.5	20.5	3	22	3.75	22	3.75	12.5	+6.25	12.5	+6.25
Lorain, O. N3	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sharon, Pa. M6	21	3.5	21.5	4	23	4.75	23	4.75	....	....	....	....
Sparrows Pt., Md. B2	19	1.5	19.5	2	21	2.75	21	2.75	11	+7.25	11	+7.25
Wheatland, Pa. W9	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+8.25	13.5	+8.25
Youngstown R2, Y1	21	3.5	21.5	4	23	4.75	23	4.75	13.5	+8.25	13.5	+8.25

*Galvanized pipe discounts based on current price of zinc (13.50c, East St. Louis).

Stainless Steel

Representative prices, cents per pound; subject to current lists of extras

AISI Type	—Rerolling— Ingot	Slabs	Forging Billets	H.R. Strip	Wire Rods; C.F. Wire	Bars; Structural Shapes	Plates	Sheets	C.R. Strip; Flat Wire
201	21.25	26.00	....	34.50	....	....	46.75	43.25	43.25
202	22.75	29.00	35.00	37.50	39.25	41.25	43.25	47.25	47.25
301	22.25	27.00	35.75	35.75	40.25	42.50	44.50	49.25	45.75
302	24.25	30.25	36.50	39.00	41.00	43.25	45.50	50.00	50.00
302B	24.50	31.50	39.25	44.00	43.25	45.50	47.50	54.75	54.75
303	....	30.75	39.50	....	44.00	46.25	48.00	54.50	54.50
304	26.00	32.00	39.00	42.50	43.75	46.00	48.75	53.25	53.25
304L	....	....	46.50	49.50	51.25	53.50	56.25	60.75	60.75
305	27.50	35.25	40.75	45.75	43.75	46.00	49.25	56.50	56.50
308	29.50	36.75	45.50	48.25	50.75	53.50	58.00	60.50	60.50
309	38.25	47.50	55.50	62.00	61.25	64.50	68.25	77.50	77.50
310	47.75	59.25	75.00	81.00	83.25	87.50	89.25	93.00	93.00
314	....	....	....	....	83.25	....	80.25	....	100.50
316	38.25	47.50	59.75	66.50	66.75	70.25	73.75	78.25	78.25
316L	....	....	67.25	73.00	74.25	77.25	81.25	85.75	85.75
317	46.25	57.75	73.75	84.75	83.00	87.25	90.00	97.00	97.00
321	31.00	38.50	45.25	51.50	50.50	53.25	57.50	63.00	63.00
18-8 CbTa	35.50	44.75	53.50	61.00	59.25	62.25	67.00	76.25	76.25
403	....	....	30.75	....	34.50	36.25	38.75	46.50	46.50
405	18.75	24.50	28.50	34.50	32.50	34.00	36.00	45.00	45.00
410	16.00	20.75	27.25	29.75	31.00	32.50	33.75	38.75	38.75
416	....	....	27.75	....	31.50	33.00	34.75	46.50	46.50
420	....	32.25	33.00	40.25	37.75	39.75	43.50	50.50	50.50
430	16.25	21.00	27.75	30.75	31.50	33.00	34.50	39.25	39.25
430F	....	....	28.25	....	32.00	33.50	35.25	49.75	49.75
431	....	27.75	36.25	....	40.25	42.50	44.25	53.75	53.75
446	....	....	37.75	56.75	42.50	44.75	46.00	67.25	67.25

Stainless Steel Producers Are: Allegheny Ludlum Steel Corp.; Alloy Metal Wire Div., H. K. Porter Co. Inc.; Alloy Tube Div., Carpenter Steel Co.; American Steel & Wire Div., U.S. Steel Corp.; Armco Steel Corp.; Babcock & Wilcox Co.; Bethlehem Steel Co.; J. Bishop & Co.; G. O. Carlson Inc.; Charter Wire Products Co.; Cold Metal Products Co.; Crucible Steel Co. of America; Damascus Tube Co.; Dearborn Div., Sharon Steel Corp.; Wilbur B. Driver Co.; Driver-Harris Co.; Eastern Stainless Steel Corp.; Elwood Ivins Steel Tube Works Inc.; Firth Sterling Inc.; Ft. Wayne Metals Inc.; Globe Steel Tubes Co.; Helical Tube Co.; Indiana Steel & Wire Co.; Ingersoll Steel Div., Borg-Warner Corp.; Jessop Steel Co.; Johnson Steel & Wire Co. Inc.; Joslyn Mfg. & Supply Co.; Kenmore Metals Corp.; Maryland Fine & Specialty Wire Co.; McInnes Steel Co.; McLouth Steel Corp.; Metal Forming Corp.; National-Standard Co.; National Tube Div., U.S. Steel Corp.; Newman-Crosby Steel Co.; Pacific Tube Co.; Page Steel & Wire Div., American Chain & Cable Co. Inc.; Pittsburgh Rolling Mills Inc.; Republic Steel Corp.; Rodney Metals Inc.; Rome Mfg. Co.; Rotary Electric Steel Co.; Sawhill Tubular Products Inc.; Sharon Steel Corp.; Simonds Saw & Steel Co.; Specialty Wire Co. Inc.; Spencer Wire Corp.; Stainless Welded Products Inc.; Standard Tube Co.; Superior Steel Corp.; Superior Tube Co.; Techalloy Co. Inc.; Timken Roller Bearing Co.; Trent Tube Co.; Tube Methods Inc.; Ulbrich Stainless Steels; United States Steel Corp.; Universal-Cyclops Steel Co.; Wallingford Steel Co.; Washington Steel Corp.

Clad Steel

	Plates—Carbon Base 5%	10%	15%	20%	Sheets—Carbon Base 20%
Stainless					
302	....	....	....	....	35.50
304	33.15	36.20	40.30	44.50	37.75
304-L	35.40	38.80	43.15	47.65	....
316	38.35	41.60	45.90	50.15	55.50
316-L	43.55	47.60	52.70	57.55	....
316-Cb	43.85	48.10	53.40	58.75	....
321	34.90	37.95	42.10	46.40	44.75
347	37.05	41.25	46.45	51.70	54.25
405	27.55	29.20	33.15	37.05	....
410	27.00	28.70	32.65	36.55	....
430	27.00	28.70	32.65	36.55	....
Inconel	47.25	57.90	65.50	79.20	....
Nickel	40.00	50.30	60.65	71.05	....
Nickel, Low Carbon	40.30	50.95	61.65	72.50	....
Monel	41.70	51.90	62.15	72.40	....
Copper*	....	....	....	....	46.00

	Strip, Carbon Base—Cold Rolled— 10%	Both Sides
Copper*	33.50	40.85

*Deoxidized. Production points: Stainless-clad sheets, New Castle, Ind. I-4; stainless-clad plates, Claymont, Del. C22, Coatesville, Pa. L7, New Castle, Ind. I-4 and Washington, Pa. J3; nickel, inconel, monel-clad plates, Coatesville L7; copper-clad strip, Carnegie, Pa. S18.

Tool Steel

Grade	$ per lb	Grade	$ per lb
Regular Carbon	0.290	Cr Hot Work	0.45-0.495
Extra Carbon	0.345	W-Cr Hot Work	0.043-0.475
Special Carbon	0.41-0.45	V-Cr Hot Work	0.460
Oil Hardening	0.450	Hi-Carbon-Cr	0.830

Grade by Analysis (%)

W	Cr	V	Co	Mo	$ per lb
20.25	4.25	1.6	12.25	....	4.170
18.25	4.25	1	4.75	....	2.385
18	4	2	9	....	2.755
18	4	2	....	....	1.845
18	4	1	....	....	1.680
9	3.5	..	....	....	1.275
13.5	4	3	....	....	1.945
13.75	3.75	2	5	....	2.325
6.4	4.5	1.9	....	5	1.185
6	4	3	....	6	1.430
1.5	4	1	....	8.5	1.040

Tool steel producers include: A4, A8, B2, B8, C4, C9, C13, C18, F2, J3, L3, M14, S8, U4, V2, and V3.

Pig Iron

F.o.b. furnace prices in dollars per gross ton, as reported to STEEL. Minimum delivered prices are approximate and do not include 3% federal tax.

Birmingham District	Basic	No. 2 Foundry	Malleable	Bessemer
AlabamaCity,Ala. R2	58.50	59.00	....	....
Birmingham R2	58.50	59.00‡	....	....
Birmingham U6	....	59.00‡	63.00	....
Woodward,Ala., W15	58.50**	59.00‡	63.00	....
Cincinnati, deld.	....	66.70	....	....
Buffalo District				
Buffalo H1, R2	62.50	63.00	63.50	64.00
Tonawanda,N.Y. W12	62.50	63.00	63.50	64.00
N.Tonawanda,N.Y. T9	....	63.00	63.50	64.00
Boston, deld.	73.79	74.29	74.79	....
Rochester,N.Y., deld.	65.52	66.02	66.52	....
Syracuse,N.Y., deld.	66.62	67.12	67.62	....
Chicago District				
Chicago I-3	62.50	63.00	63.00	63.50
Gary,Ind. U5	62.50	....	63.00	....
S.Chicago,Ill. R2	62.50	....	63.00	....
S.Chicago,Ill. Y1	62.50	63.00	63.00	....
S.Chicago,Ill. U5	62.50	....	63.00	63.50
S.Chicago,Ill. W14	62.50	....	63.00	63.50
Milwaukee, deld.	64.96	65.46	65.46	65.96
Muskegon,Mich., deld.	....	76.83	76.83	....
Cleveland District				
Cleveland R2, A7	62.50	63.00	63.00	63.50
Akron,O., deld.	65.25	65.75	65.75	66.25
Mid-Atlantic District				
Birdsboro,Pa. B10	64.50	65.00	65.50	66.00
Chester,Pa. P4	64.50	65.00	65.50	....
Philadelphia, deld.	66.26	66.76	67.26	....
Swedeland,Pa. A3	64.50	65.00	65.50	66.00
New York, deld.	....	71.20	71.70	....
Newark,N.J., deld.	68.52	69.02	69.52	70.02
Philadelphia, deld.	66.38	66.88	67.38	67.88
Troy,N.Y. R2	64.50	65.00	65.50	66.00
Pittsburgh District				
NevilleIsland,Pa. P6	62.50	63.00	63.00	63.50
Pittsburgh (N&S sides), Aliquippa, deld.	....	64.45	64.45	64.95
McKeesRocks,Pa., deld.	....	64.10	64.10	64.62
Lawrenceville, Homestead, Wilmerding, Monaca,Pa., deld.	....	64.76	64.76	65.29
Verona, Trafford,Pa., deld.	64.79	65.32	65.32	65.85
Brackenridge,Pa., deld.	65.10	65.60	65.60	66.13
Bessemer,Pa. U5	62.50	....	63.00	63.50
Clairton,Rankin,S.Duquesne,Pa. U5	62.50	....	....	....
Midland,Pa. C18	62.50	....	....	....

Youngstown District	Basic	No. 2 Foundry	Malleable	Bessemer
Hubbard,O. Y1	....	....	63.00	....
Sharpsville,Pa. S6	62.50	....	63.00	63.50
Youngstown Y1	....	....	63.00	63.50
Mansfield,O., deld.	67.40	....	67.90	68.40
Duluth I-3	62.50	63.00	63.00	63.50
Erie,Pa. I-3	62.50	63.00	63.00	63.50
Everett,Mass. E1	64.50	65.00	65.50	....
Fontana,Calif. K1	70.50	71.00	....	....
Geneva,Utah C11	62.50	63.00	....	....
GraniteCity,Ill. G4	64.40	64.90	65.40	....
Ironton,Utah C11	62.50	63.00	....	....
LoneStar,Tex. L6	58.50*	59.00†	....	....
Minnequa,Colo. C10	64.50	65.00	65.50	....
Rockwood,Tenn. T3	....	59.00‡	63.00	....
Toledo,O. I-3	62.50	63.00	63.00	63.50
Cincinnati, deld.	68.26	68.76	....	....

*Phos. 0.51-0.75%; Phos. 0.31-0.50%, $59.50.
**Phos. 0.70-0.90%; Phos. 0.30-0.60%, $59.50.
†Phos. 0.51-0.75%; Phos. 0.31-0.50%, $60.
‡Phos. 0.70-0.90%; Phos. 0.30-0.50%, $60.

PIG IRON DIFFERENTIALS

Silicon: Add 50 cents per ton for each 0.25% Si or percentage thereof over base grade, 1.75-2.25%, except on low phos. iron on which base is 1.75-2.00%.

Manganese: Add 50 cents per ton for each 0.50% manganese over 1% or portion thereof.

Nickel: Under 0.50% no extra; 0.50-0.74%, inclusive, add $2 per ton and each additional 0.25%, add $1 per ton.

BLAST FURNACE SILVERY PIG IRON, Gross Ton

(Base 6.00-6.50% silicon; add $1.25 for each 0.5% Si; 75 cents for each 0.50% Mn over 1%)

Jackson,O. I-3, J1	71.50
Buffalo H1	72.75

ELECTRIC FURNACE SILVERY IRON, Gross Ton

(Base 14.01-14.50% silicon; add $1 for each 0.5% Si to 18%; $1 for each 0.50% Mn over 1%; $2 per gross ton premium for 0.045% max P)

CalvertCity,Ky. P15	$105.50
NiagaraFalls,N.Y. P15	105.50
Keokuk,Iowa, Open-hearth & Fdry, freight allowed K2	110.00
Keokuk, O.H. & Fdry, 12½ lb piglets, 16% Si, frgt allowed K2	113.00

LOW PHOSPHORUS PIG IRON, Gross Ton

Lyles,Tenn. T3 (Phos. 0.035% max)	$76.50
Rockwood,Tenn. T3 (Phos. 0.035% max)	76.50
Troy,N.Y. R2 (Phos. 0.035% max)	70.50
Philadelphia, deld.	78.26
Cleveland A7 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Duluth I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
Erie,Pa. I-3 (Intermediate) (Phos. 0.036-0.075% max)	67.50
NevilleIsland,Pa. P6 (Intermediate) (Phos. 0.036-0.075% max)	67.50

Warehouse Steel Products

Representative prices, per pound, subject to extras, f.o.b. Warehouse. City delivery charges are 15 cents per 100 lb except: Moline, Norfolk, Richmond, Washington, 20 cents; Baltimore, Boston, Los Angeles, New York, Philadelphia, Portland, Spokane San Francisco, 10 cents; Atlanta, Houston, Seattle no charge.

	SHEETS				STRIP	BARS				Standard Structural Shapes	PLATES	
	Hot-Rolled	Cold-Rolled	Gal. 10 Ga.†	Stainless Type 302	Hot-Rolled*	H.R. Merchant Qual.	H.R. Spec. Qual.	C.F. Rds.‡	H.R. Alloy 4140††[4]		Carbon	Floor
Atlanta	8.17§	9.37§	9.83§	....	8.21	8.30	...	10.23	....	8.59	8.55	10.51
Baltimore	7.88	8.98	9.12	....	8.36	8.38	8.71	9.13[2]	14.68	8.75	8.26	9.76
Birmingham	7.80§	9.00§	9.52§	....	7.82	7.91	8.44	10.12	...	8.20	8.16	10.08
Boston	8.84	9.88	11.06	....	8.89	8.88	9.43	10.71	14.49	9.10	9.18	10.44
Buffalo	7.85	9.00	10.75	....	8.05	8.00	8.70	8.70	14.35	8.50	8.50	10.05
Chattanooga	8.00§	9.20§	9.10§	....	8.05	8.13	8.66	10.04	...	8.42	8.38	10.02
Chicago	7.80	9.00	9.70	....	7.82	7.91	8.44	8.35	13.95	8.20	8.16	9.49
Cincinnati	7.94	9.05	9.75	....	8.14	8.19	8.72	8.82	14.23	8.74	8.52	9.78
Cleveland	7.78	8.98	9.60	....	7.92	7.99	8.52	8.60	14.04	8.57	8.39	9.46
Denver	9.55	11.09	12.41	....	9.70	9.75	...	10.54	18.89	9.60	9.50	11.15
Detroit	8.03	9.25	10.05	....	8.17	8.18	8.71	8.68	14.21	8.74	8.51	9.74
Erie, Pa.	7.75	8.88	9.60[10]	....	7.90	8.00	8.65	8.70[10]	....	8.35	8.20	9.50
Houston	8.70	9.65	10.99	....	8.80	8.95	9.50	10.55	15.00	8.90	8.60	10.10
Jackson, Miss.	8.10§	9.30§	9.79§	....	8.15	8.23	8.76	10.23	...	8.52	8.48	10.11
Los Angeles	9.10	10.80	11.65	....	9.15	8.80	9.50	11.70	15.25	8.95	9.35	11.50
Milwaukee	7.93	9.13	9.83	....	7.95	8.04	8.57	8.58	14.08	8.41	8.29	9.62
Moline, Ill.	8.05	9.25	10.05	....	8.13	8.26	...	8.70	....	7.78	8.36	...
New York	8.45	9.66	10.23	60.20	8.90	8.86	9.41	10.65	14.39	8.91	9.01	10.07
Norfolk, Va.	8.05	...	...	....	8.55	8.60	...	10.80	....	8.95	8.45	9.95
Philadelphia	8.15	9.07	10.02	....	8.82	8.55	9.08	9.31	14.31	8.70	8.68	9.70
Pittsburgh	7.78	8.99	10.05	50.00	7.92	7.91	8.44	8.60	13.95	8.20	8.16	9.49
Portland, Oreg.	8.90	9.65	11.40	....	9.05	8.95	...	13.55	14.60	8.90	8.70	11.60
Richmond, Va.	8.00	...	10.14	....	8.55	8.92	9.20	10.00	....	8.95	8.40	9.90
St. Louis	8.14	9.34	10.06	....	8.19	8.28	8.81	8.96	14.31	8.67	8.52	9.86
St. Paul	8.29	9.49	10.31	....	8.43	8.52	...	9.21	....	8.94	8.90	9.87
San Francisco	8.75	10.30	10.80	....	8.95	8.80	9.35	12.30	15.25	8.85	8.85	11.15
Seattle	9.55	10.70	11.65	....	9.55	9.30	9.85	13.30	15.65	9.35	9.30	11.40
Spokane, Wash.	9.60	10.75	11.70	....	9.60	9.30	9.85	13.35	16.45	9.40	9.35	11.45
Washington	8.48	9.58	...	....	9.06	8.98	...	9.73	....	9.35	8.86	10.36

*Prices do not include gage extras; †prices include gage and coating extras (based on 12.50c zinc at Los Angeles and 13.50c at other points), except in Birmingham (coating extra excluded); ‡includes 35-cent bar quality extras; **⅛-in. and heavier; ††as annealed; §42 in. and under.

Base quantities, 2000 to 4999 lb except as noted; cold-rolled strip and cold-finished bars, 2000 lb and over except in Seattle, 2000 to 9999 lb, and in Los Angeles, 6000 lb and over; stainless sheets, 5000 lb except in Chicago, New York and Boston, 10,000 lb and in San Francisco, 2000 to 4999 lb; hot-rolled products on West Coast, 2000 to 9999 lb; [2]—400 to 999 lb; [4]—1000 to 1999 lb; [5]—2000 to 3999 lb; [10]—2000 lb and over.

Refractories

Fire Clay Brick (per 1000)

High-Heat Duty: Ashland, Grahn, Hayward, Hitchins, Haldeman, Olive Hill, Ky., Athens, Troup, Tex., Beach Creek, Clearfield, Curwensville, Lock Haven, Lumber, Orviston, West Decatur, Pa., Bessemer, Ala., Farber, Mexico, St. Louis, Vandalia, Mo., Ironton, Oak Hill, Parral, Portsmouth, O., Ottawa, Ill., Stevens Pottery, Ga., $128; Salina, Pa., $133; Niles, O., $138; Cutler, Utah, $148.

Super-Duty: Ironton, O., Vandalia, Mo., Olive Hill, Ky., Clearfield, Salina, Pa., New Savage, Md., St. Louis, $165; Stevens Pottery, Ga., $175.

Silica Brick (per 1000)

Standard: Alexandria, Claysburg, Mt. Union, Sproul, Pa., Ensley, Ala., Ft. Matilda, Pa., Portsmouth, O., Hawstone, Pa., $140; Warren, Niles, Windham, O., Hays, Latrobe, Morrisville, Pa., $145; E. Chicago, Ind., Joliet, Rockdale, Ill., $150; Lehigh, Utah, $165; Los Angeles, $170.

Super-Duty: Hays, Sproul, Hawstone, Pa., Niles, Warren, Windham, O., Leslie, Md., Athens, Tex., $157; Morrisville, Latrobe, Pa., $160; Curtner, Calif., $182.

Semisilica Brick (per 1000)

Clearfield, Pa., $145; Woodbridge, N. J., $128; Philadelphia, $130.

Ladle Brick (per 1000)

Dry Pressed: Alsey, Ill., Chester, New Cumberland, W. Va., Freeport, Johnstown, Merrill Station, Vanport, Pa., Mexico, Vandalia, Mo., Wellsville, Irondale, New Salisbury, O., $96; Clearfield, Pa., Portsmouth, O., $98.

High-Alumina Brick (per 1000)

50 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $220; Danville, Ill., $223; Philadelphia, Clearfield, Pa., $230.

60 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $275; Danville, Ill., $278; Philadelphia, Clearfield, Pa., $285.

70 *Per Cent:* St. Louis, Mexico, Vandalia, Mo., $315; Danville, Ill., $318; Philadelphia, Clearfield, Pa., $325.

Sleeves (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $177; Clearfield, Pa., $189.

Nozzles (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., St. Louis, $292; Clearfield, Pa., $311.

Runners (per 1000)

Reesdale, Johnstown, Bridgeburg, Pa., $221; Clearfield, Pa., $236.

Dolomite (per net ton)

Domestic, dead-burned, bulk, Billmeyer, Blue Bell, Williams, Plymouth Meeting, York, Pa., Millville, W. Va., Bettsville, Millersville, Martin, Woodville, O., Gibsonburg, Narlo, O., $16; Thornton, McCook, Ill., $16.35; Dolly Siding, Bonne Terre, Mo., $15.

Magnesite (per net ton)

Domestic, dead-burned, bulk ⅛-in. grains with fines: Chewelah, Wash., Luning, Nev. $43; ⅜-in. grains with fines: Baltimore, $69.40.

Fluorspar

Metallurgical grades, f.o.b. shipping point, in Ill., Ky., net tons, carloads, effective CaF_2 content 72.5%, $38-39; 70%, $35-36; 60%, $31-32. Imported, net tons, f.o.b. cars point of entry, duty paid, metallurgical grade: European, $34; Mexican, $26.50.

Ores

Lake Superior Iron Ore

(Prices effective for the 1957 shipping season, gross tons, 51.50% iron natural, rail of vessel, lower lake ports.)

Mesabi bessemer	$11.60
Mesabi nonbessemer	11.45
Old range bessemer	11.85
Old range nonbessemer	11.70
Open-hearth lump	12.70
High phos.	11.45

The foregoing prices are based on upper lake rail freight rates, lake vessel freight rates, handling and unloading charges, and taxes thereon, which were in effect Jan. 30, 1957, and increases or decreases after that date are absorbed by the seller.

Eastern Local Iron Ore

Cents per unit, deld. E. Pa.

Foundry and basic 52-62% concentrates contract	17.00-18.00

Foreign Iron Ore

Cents per unit, c.i.f. Atlantic ports

Swedish basic, 65%	27.00-27.50
N. African hematite (spot)	nom. 24.00-25.00
Brazilian iron ore, 68-69%	35.00-36.00

Tungsten Ore

Net ton unit, before duty

Foreign, wolframite, good commercial quality	$27.00-28.00
Domestic, concentrates, mine	55.00

Manganese Ore

Mn 46-48%, Indian (export tax included), $1.60-1.70 per long ton unit, c.i.f. U.S. ports, duty for buyer's account; other than Indian, $1.45-1.50; contracts by negtiation.

Chrome Ore

Gross ton f.o.b. cars New York, Philadelphia, Baltimore, Charleston, S. C., plus ocean freight differential for delivery to Portland, Oreg., Tacoma, Wash.

Indian and Rhodesian

48% 3:1	$54.00-57.00
48% 2.8:1	51.00-54.00
48% no ratio	43.00-45.00

South African Transvaal

48% no ratio	$37.50-39.00
44% no ratio	26.00-27.00

Turkish

48% 3:1	$60.00-63.00

Domestic

Rail nearest seller	
18% 3:1	$39.00

Molybdenum

Sulphide concentrate, per lb of Mo content, mines, unpacked	$1.18

Antimony Ore

Per unit of Sb content, c.i.f. seaboard

55-60%	$3.20-3.65
60-65%	3.65-3.75

Vanadium Ore

Cents per lb V_2O_5

Domestic	31.00

Metal Powder

(Per pound f.o.b. shipping point in ton lots for minus 100 mesh, except as noted)

	Cents
Sponge iron:	
Swedish, c.i.f. Camden, N.J., c.l. in bags	8.50
Domestic:	
F.o.b., Johnstown, Pa., Niagara Falls, N. Y., in bags	9.50
F.o.b., Riverton, N. J., in bags	8.50
Canadian, f.o.b. shipping point	9.50
Electrolytic iron:	
Melting stock, 99.9% Fe, irregular fragments of ⅛ in. x 1.3 in.	26.00
Annealed, 99.5% Fe	36.50
Unannealed (99+ % Fe)	34.00
Unannealed (99+ % Fe) (minus 325 mesh)	59.00
Powder Flakes (minus 16, plus 100 mesh)	29.00
Carbonyl Iron:	
98.1-99.9%, 3 to 20 microns, depending on grade, 86.00-275.00, in standard 200-lb containers; all minus 200 mesh.	
Aluminum:	
Atomized, 500 lb, drum, frght allowed	
Carlots	36.20
Ton lots	37.20
Antimony, 500 lb lots	32.00*
Brass, 5000-lb lots	36.80-46.80†
Bronze, 5000-lb lots	56.20-60.00†
Copper:	
Electrolytic	14.25*
Reduced	14.25*
Lead	7.50*
Manganese:	
Minus 35 mesh	64.00
Minus 100 mesh	70.00
Minus 200 mesh	75.00
Nickel, unannealed	$1.05
Nickel-Silver, 5000-lb lots	56.10-60.10†
Phosphor-Copper, 5000-lb lots	66.00
Copper (atomized) 5000-lb lots	48.50-56.00‡
Silicon	47.50
Solder	7.00*
Stainless Steel, 304	$1.05
Stainless Steel, 316	$1.40
Tin	14.50*
Zinc, 5000-lb lots	19.75-33.00†
Tungsten:	Dollars
Melting grade, 99%	
60 to 2000 mesh:	
1000 lb and over	4.20
Less than 1000 lb	4.35
Chromium, electrolytic 99.8% Cr min. metallic basis	5.00

*Plus cost of metal. †Depending on composition. ‡Depending on mesh. §70% Cu, 20% Zn, 10% Ni. **64% Cu, 18% Zn, 18% Ni.

Electrodes

Threaded with nipple; unboxed, f.o.b. plant

GRAPHITE

Inches Diam.	Length	Per 100 lb
2	24	$57.75
2½	30	37.25
3	40	35.25
4	40	33.25
5⅛	40	33.00
6	60	30.00
7	60	26.75
8, 9, 10	60	26.50
12	72	25.50
14	60	25.50
16	72	24.50
17	60	25.50
18	72	24.50
20	72	24.00
24	84	24.75

CARBON

8	60	13.30
10	60	13.00
12	60	12.95
14	60	12.85
14	72	11.95
17	60	11.85
17	72	11.40
20	84	11.40
20	90	11.00
24	72, 84	11.25
24	96	10.95
30	84	11.05
40, 35	110	10.70
40	100	10.70

Metallurgical Coke

Price per net ton

Beehive Ovens

Connellsville, furnace	$14.50-15.50
Connellsville, foundry	17.50-18.50

Oven Foundry Coke

Birmingham, ovens	$27.60
Cincinnati, deld.	32.53
Buffalo, ovens	29.50
Camden, N. J. ovens	29.50
Detroit, ovens	30.50
Pontiac, deld.	32.25
Saginaw, deld.	33.83
Erie, Pa., ovens	30.50
Everett, Mass., ovens	
New England, deld	31.55*
Indianapolis, ovens	29.75
Ironton, O., ovens	28.00
Cincinnati, deld.	28.25
Kearny, N.J., ovens	30.00
Lone Star, Tex., ovens	25.50
Milwaukee, ovens	30.50
Painesville, O., ovens	30.50
Cleveland, deld.	32.55
Philadelphia, ovens	29.50
St. Louis, ovens	31.50
Neville Island (Pittsburgh), Pa., ovens	29.25
St. Paul, ovens	29.75
Chicago, deld.	33.14
Swedeland, Pa., ovens	29.50
Terre Haute, Ind., ovens	29.75

*Or within $4.55 freight zone from works.

Imported Steel

(Base per 100 lb, landed, duty paid, based on current ocean rates. Any increase in these rates is for buyer's account. Source of shipment: Western continental European countries)

	North Atlantic	South Atlantic	Gulf Coast	West Coast
Deformed Bars, Intermediate, ASTM-A 305	$7.15	$7.15	$7.15	$7.40
Bar Size Angles	7.11	7.11	7.11	7.28
Structural Angles	7.30	7.30	7.30	7.60
I-Beams	7.75	7.75	7.75	8.15
Plates (basic bessemer)	9.30	9.30	9.30	9.70
Sheets, H.R.	8.55	8.55	8.55	8.85
Sheets, C.R. (drawing quality)	8.95	8.95	8.95	9.35
Furring Channels, C.R., 1000 ft, ¾ x 0.30 lb per ft	27.17	27.17	27.17	27.64
Barbed Wire (†)	6.80	6.80	6.80	7.25
Merchant Bars	7.15	7.15	7.15	7.50
Hot-Rolled Bands	7.25	7.25	7.25	7.65
Wire Rods, Thomas Commercial No. 5	6.38	6.38	6.38	6.78
Wire Rods, O-H Cold Heading Quality No. 5	6.72	6.72	6.72	7.12
Bright Common Wire Nails (‡)	8.45	8.45	8.45	8.87

Oil Country Pipe: Mills withdrawn temporarily.

†Per 82-lb. net, reel. ‡Per 100-lb kegs, 20d nails and heavier.

Coal Chemicals

Spot, cents per gallon, ovens

Pure benzene	36.00
Toluene, one deg.	32.00-34.00
Industrial xylene	32.00-35.00

Per ton, bulk, ovens

Ammonium sulfate	$32.00

Cents per pound, producing point

Phenol: Grade 1, 15.00; Grade 2-3, 14.50; Grade 4, 16.50; Grade 5, 15.25.

Ferroalloys

MANGANESE ALLOYS

Spiegeleisen: Carlot, per gross ton, Palmerton, Pa. 21-23% Mn, $105; 19-21% Mn, 1-3% Si, $102.50; 16-19% Mn, $100.50.

Standard Ferromanganese: (Mn 74-76%, C 7% approx). Base price per net ton: $255, Johnstown, Duquesne, Sheridan, Pa., Alloy, W. Va.; Ashtabula, Marietta, O.; Sheffield, Ala.; Portland, Oreg. Add or subtract $2 for each 1% or fraction thereof of contained manganese over 76% or under 74%, respectively.

(Mn 79-81%). Lump $263 per net ton, f.o.b. Anaconda or Great Falls, Mont. Add $2.60 for each 1% above 81%; subtract $2.60 for each 1% below 79%, fractions in proportion to nearest 0.1%.

Low-Carbon Ferromanganese, Regular Grade: (Mn 85-90%). Carload, lump, bulk, max, 0.07% C, 35.1c per lb of contained Mn, carload packed 36.4c, ton lots 37.9c, less ton 39.1c. Delivered. Deduct 1.5c for max 0.15% C grade from above prices, 3c for max 0.03% C, 3.5c for max 0.50% C, and 6.5c for max 75% C—max 7% Si. **Special Grade:** (Mn 90% min, C 0.07% max, P 0.06% max). Add 2.05c to the above prices. Spot, add 0.25c.

Medium-Carbon Ferromanganese: (Mn 80-85%, C 1.25-1.5%, Si 1.5% max). Carload, lump, bulk, 25.5c per lb of contained Mn, packed, carload 26.8c, ton lot 28.4c, less ton 29.6c. Delivered. Spot, add 0.25c.

Manganese Metal: 2" x D (Mn 95.5% min, Fe 2% max, Si 1% max, C 0.2% max). Carload, lump, bulk, 45c per lb of metal; packed, 45.75c; ton lot 47.25c; less ton lot 49.25c. Delivered. Spot, add 2c.

Electrolytic Manganese Metal: Min carload, 33c; 2000 lb to min carload, 35c; 500 lb to 1999 lb, 37c; 50 lb cans, add 0.5c per lb. Premium for hydrogen-removed metal, 0.75c per lb. Prices are f.o.b. cars, Knoxville, Tenn., freight allowed to St. Louis or to any point east of Mississippi; or f.o.b. Marietta, O., freight allowed.

Silicomanganese: (Mn 65-68%). Contract, lump, bulk 1.50% C grade, 18-20% Si, 13.8c per lb of alloy. Packed, c.l. 15c, ton 15.45c, less ton 16.45c, f.o.b. Alloy, W. Va., Ashtabula, O., Marietta, O., Sheffield, Ala., Portland, Oreg. For 2% C grade, Si 15-17%, deduct 0.2c from above prices. For 3% C grade, Si 12-14.5%, deduct 0.4c from above prices. Spot, add 0.25c.

TITANIUM ALLOYS

Ferrotitanium, Low-Carbon: (Ti 20-25%, Al 3.5% max, Si 4% max, C 0.10% max). Contract, ton lot, 2" x D, $1.50 per lb of contained Ti; less ton $1.55. (Ti 38-43%, Al 8% max, Si 4% max, C 0.10% max). Ton lot $1.35, less ton $1.37, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis. Spot, add 5c.

Ferrotitanium, High-Carbon: (Ti 15-18%, C 6-8%). Contract $200 per ton, f.o.b. Niagara Falls, N. Y., freight allowed to destinations east of Mississippi river and north of Baltimore and St. Louis.

Ferrotitanium, Medium-Carbon: (Ti 17-21%, C 2-4.5%). Contract $225 per ton, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

CHROMIUM ALLOYS

High-Carbon Ferrochrome: Contract, c.l. lump, bulk, 27.75c per lb of contained Cr; c.l. packed 29.3c, ton lot 31.05c; less ton 32.45c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome: (Cr 67-71%). Contract, carload, lump, bulk, C 0.025% max (Simplex) 34.75c per lb contained Cr, 0.02% max 41.5c, 0.03% max 41c, 0.06% max 39.5c, 0.1% max 39c, 0.15% max 38.75c, 0.2% max 38.5c, 0.5% max 38.25c, 1.0% max 37.5c, 1.5% max 37.35c, 2.0% max 37.25c. Ton lot, add 3.4c, less ton add 5.1c. Carload packed add 1.75c. Delivered. Spot, add 0.25c.

Foundry Ferrochrome, High-Carbon: (Cr 62-66%, C 5-7%, Si 7-10%). Contract, c.l., 2 in. x D, bulk 29.05c per lb contained Cr. Packed, c.l. 30.65c, ton 32.45c, less ton 33.95c. Delivered. Spot, add 0.25c.

Foundry Ferrosilicon Chrome: (Cr 50-54%, Si 28-32%, C 1.25% max). Contract, carload, packed, 8 M x D, 20.85c, per lb of alloy, ton lot 22.10c; less ton lot 23.3c. Delivered. Spot, add 0.25c.

Low-Carbon Ferrochrome-Silicon: (Cr 39-41%, Si 42-49%, C 0.05% max). Contract, carload, lump, 4" x down and 2" x down, bulk, 41.35c per lb of contained Cr; 1" x down, bulk 42.35c. Delivered.

Chromium Metal, Electrolytic: Commercial grade (Cr 99.8% min, metallic basis, Fe 0.2% max). Contract, carlot, packed 2" x D plate (about ⅛" thick) $1.29 per lb, ton lot $1.31, less ton lot $1.33. Delivered. Spot, add 5c.

VANADIUM ALLOYS

Ferrovanadium: Open-hearth Grade (V 50-55%, Si 8% max, C 3% max). Contract, any quantity, $3.20 per lb of contained V. Delivered. Spot, add 10c. **Special Grade:** (V 50-55% or 70-75%, Si 2% max, C 0.5% max) $3.30. **High Speed Grade:** (V 50-55%, or 70-75%, Si 1.50% max, C 0.20% max) $3.40.

Grainal: Vanadium Grainal No. 1, $1.05 per lb; No. 6, 68c; No. 79, 50c, freight allowed.

Vanadium Oxide: Contract, less carload lot, packed, $1.38 per lb contained V_2O_5, freight allowed. Spot, add 5c.

SILICON ALLOYS

25-30% Ferrosilicon: Contract, carload, lump, bulk, 20.0c per lb of contained Si. Packed 21.40c; ton lot 22.50c, f.o.b. Niagara Falls, N. Y., freight not exceeding St. Louis rate allowed.

50% Ferrosilicon: Contract, carload, lump, bulk, 13.9c per lb of contained Si. Packed c.l. 16.4c, ton lot 17.85c, less ton 19.5c, f.o.b. Alloy, W. Va., Ashtabula, Marietta, O., Sheffield, Ala., and Portland, Oreg. Spot, add 0.45c.

Low Aluminum 50% Ferrosilicon: (Al 0.40% max). Add 1.45c to 50% ferrosilicon prices.

65% Ferrosilicon: Contract, carload, lump, bulk, 15.25c per pound contained silicon. Packed, c.l. 17.25c, ton lot, 19.05c; less ton 20.4c. Delivered. Spot, add 0.35c.

75% Ferrosilicon: Contract, carload, lump, bulk, 16.4c per lb of contained Si. Packed, c.l. 18.30c, ton lot 19.95c, less ton 21.2c. Delivered. Spot, add 0.3c.

90% Ferrosilicon: Contract, carload, lump, bulk, 19.5c per lb of contained Si. Packed, c.l. 21.15c, ton lot 22.55c, less ton 23.6c. Delivered. Spot, add 0.25c.

Silicon Metal: (98% min Si, 0.75% max Fe, 0.07% max Ca). C.l. lump, bulk, 21.5c per lb of Si. Packed, c.l. 23.15c, ton lot 24.45c, less ton 25.45c. Add 0.5c for max 0.03% Ca grade. Deduct 0.5c for max 2% Fe grade analyzing min 96.5% Si. Spot, add 0.25c.

Alsifer: (Approx 20% Al, 40% Si, 40% Fe). Contract, basis f.o.b. Niagara Falls, N. Y., lump, carload, bulk, 10.65c per lb of alloy, ton lot, packed, 11.8c.

ZIRCONIUM ALLOYS

12-15% Zirconium Alloy: (Zr 12-15%, Si 39-43%, C 0.20% max). Contract, c.l. lump, bulk 9.25c per lb of alloy. Packed, c.l. 10.45c, ton lot 11.6c, less ton 12.45c. Delivered. Spot, add 0.25c.

35-40% Zirconium Alloy: (Zr 35-40%, Si 47-52%, Fe 8-12%, C 0.50% max). Contract, carload, lump, packed 27.25c per lb of alloy, ton lot 28.4c, less ton 29.65c. Freight allowed. Spot, add 0.25c.

BORON ALLOYS

Ferroboron: (B 17.50% min, Si 1.50% max, Al 0.50% max, C 0.50% max). Contract, 100 lb or more 1" x D, $1.20 per lb of alloy; less than 100 lb $1.30. Delivered. Spot, add 5c. F.o.b. Washington, Pa., prices, 100 lb and over, are as follows: Grade A (10-14% B) 85c per lb; Grade B (14-18% B) $1.20; Grade C (19% min B) $1.50.

Borosil: (3 to 4% B, 40 to 45% Si). Carload, bulk, lump or 3" x D, $5.25 per lb of contained B. Packed, carload $5.40, ton to c.l. $5.50, less ton $5.60. Delivered.

Bortam: (B 1.5%-1.9%). Ton lot, 45c per lb; less than ton lot, 50c per lb.

Carbortam: (B 1 to 2%). Contract, lump, carload 9.50c per lb, f.o.b. Suspension Bridge, N. Y., freight allowed same as high-carbon ferrotitanium.

CALCIUM ALLOYS

Calcium-Manganese-Silicon: (Ca 16-20%, Mn 14-18% and Si 53-59%). Contract, carload, lump, bulk 23c per lb of alloy, carload packed 24.25c, ton lot 26.15c, less ton 27.15c. Delivered. Spot, add 0.25c.

Calcium-Silicon: (Ca 30-33%, Si 60-65%, Fe 1.5-3%). Contract, carload, lump, bulk 24c per lb of alloy, carload packed 25.65c, ton lot 27.95c, less ton 29.45c. Delivered. Spot, add 0.25c.

BRIQUETTED ALLOYS

Chromium Briquets: (Weighing approx. 3% lb each and containing 2 lb of Cr). Contract, carload, bulk, 19c per lb of briquet, carload packed in box pallets 19.2c, in bags 20.1c; 3000 lb to c.l. in box pallets 20.4c; 2000 lb to c.l. in bags, 21.3c; less than 2000 lb in bags 22.2c. Delivered. Add 0.25c for notching. Spot, add 0.25c.

Ferromanganese Briquets: (Weighing approx 3 lb and containing 2 lb of Mn). Contract, carload, bulk 14.8c per lb of briquet; c.l., packed, pallets 15c, bags 16c; 3000 lb to c.l., pallets 16.2c; 2000 lb to c.l. bags, 17.2c, less ton 18.1c. Delivered. Add 0.25 for notching. Spot, add 0.25c.

Silicomanganese Briquets: (Weighing approx 3½ lb and containing 2 lb of Mn and approx ½ lb of Si). Contract, c.l. bulk 15.1c per lb of briquet; c.l. packed, pallets, 15.3c; bags 16.3c, 3000 lb to c.l., pallets, 16.5c; 2000 lb to c.l., bags 17.5c; less ton 18.4c. Delivered. Add 0.25c for notching. Spot, add 00.25c.

Silicon Briquets: (Large size—weighing approx. 5 lb and containing 2 lb of Si). Contract, carload, bulk, 7.7c per lb of briquet, packed, pallets, 7.9c; bags 8.9c; 3000 lb to c.l., pallets 9.5c; 2000 lb to c.l. bags 10.5c; less ton 11.4c. Delivered. Spot, add 0.25c. (Small size—weighing approx. 2½ lb and containing 1 lb of Si). Carload, bulk 7.85c. Packed, pallets 8.05c; bags 9.05c; 3000 lb to c.l. pallets 9.65c; 2000 lb to c.l. bags 10.65c; less ton 11.55c. Delivered. Add 0.25c for notching, small size only. Spot, add 0.25c.

Molybdic-Oxide Briquets: (Containing 2½ lb of Mo each). $1.41 per pound of Mo contained, f.o.b. Langeloth, Pa.

TUNGSTEN ALLOYS

Ferrotungsten: (70-80%). 5000 lb W or more $3.15 per lb of contained W; 2000 lb W to 5000 lb W, $3.25; less than 2000 lb W, $3.37. Delivered.

OTHER FERROALLOYS

Ferrocolumbium: (Cb 50-60%, Si 8% max, C 0.4% max). Contract, ton lot, 2" x D, $6.90 per lb of contained Cb. Delivered. Spot, add 10c.

Ferrotantalum—Columbium: (Cb 40% approx., Ta 20% approx., and Cb plus Ta 60% min, C 0.30% max). Ton lot 2" x D, $4.95 per lb of contained Cb plus Ta, delivered; less ton lot $5.

SMZ Alloy: (Si 60-65%, Mn 5-7%, Zr 5-7%, Fe 20% approx.). Contract, c.l. packed ½-in. x 12 M 19c per lb of alloy, ton lot 20.15c, less ton 21.4c. Delivered. Spot, add 0.25c.

Graphidox No. 5: (Si 48-52%, Ca 5.7%, Ti 9-11%). C.l. packed, 19c per lb of alloy, ton lot 20.15c; less ton lot 21.4c, f.o.b. Niagara Falls, N. Y.; freight allowed to St. Louis.

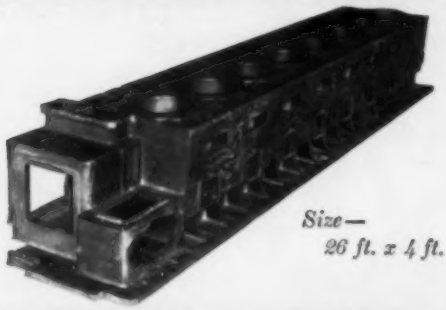
V-5 Foundry Alloy: (Cr 38-42%, Si 17-19%, Mn 8-11%). C.l. packed 18.1c per lb of alloy; ton lot 19.55c; less ton lot 20.8c, f.o.b. Niagara Falls, N. Y., freight allowed to St. Louis.

Simanal: (Approx. 20% each Si, Mn, Al; bal. Fe). Lump, carload, bulk 18.50c. Packed c.l. 19.50c, 2000 lb to c.l. 20.50c, less than 2000 lb 21c per lb of alloy. Delivered.

Ferrophosphorus: (23-25% based on 24% P content with unitage of $4 for each 1% of P above or below the base); carload, f.o.b. sellers' works, Mt. Pleasant, Sigio, Tenn., $90 per gross ton.

Ferromolybdenum: (55-75%). Per lb contained Mo, in 200-lb container, f.o.b. Langeloth and Washington, Pa., $1.68 in all sizes except powdered which is $1.74.

Technical Molybdic-Oxide: Per lb contained Mo, in cans, $1.39; in bags, $1.38, f.o.b. Langeloth and Washington, Pa.



Size—
26 ft. x 4 ft.

PRECISION
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This air-actuated lift cylinder required no machining when Dresser ring-making facilities were used. Working surfaces were simply sandblasted and burnished for smoothness.

Machining operations can be considerably reduced, sometimes eliminated, with Dresser Weldments. The first step is to think of your product's design in terms of rings—then consult with Dresser.

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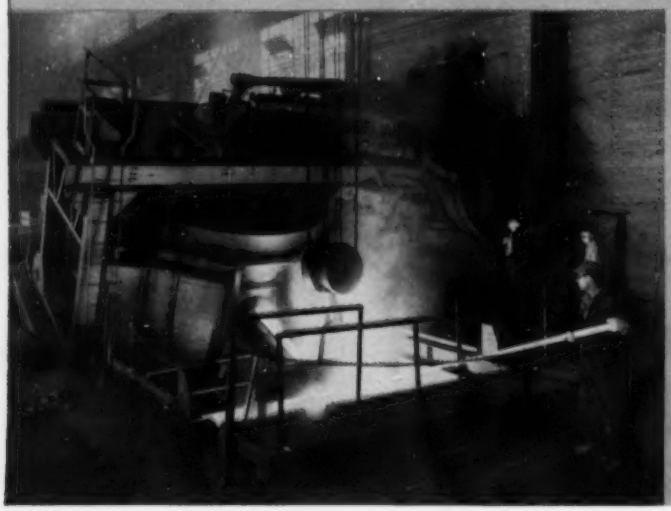

Whatever your needs for stainless steel sheets and plates, remember that Ingersoll specializes not only in *solid* stainless, but in *heat-resisting* alloys, and *stainless-clad* sheets as well.

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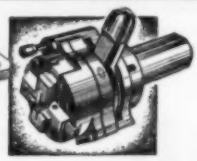

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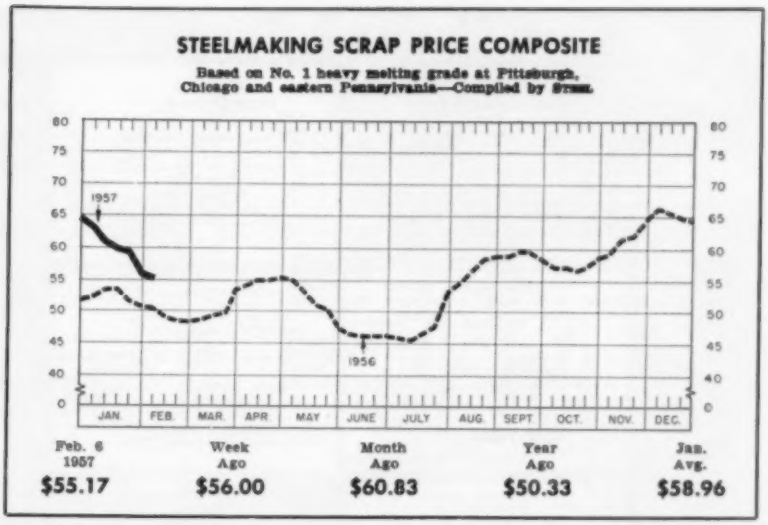

Scrap Moves at Lower Levels

Large purchases by important producers indicate the steep decline in prices may be nearing end. Market also gains support from active export demand

Scrap Prices, Page 158

Pittsburgh—A mill on the fringe of the Pittsburgh area bought No. 1 heavy melting scrap at $55 in the major purchase last week. The price equaled last week's purchase by two major users. It indicated to market observers that the price of the leading grade is leveling off. A small purchase of No. 2 bundles was made for $45 a ton, representing a decrease of $1 from the previous week's price.

Closing of railroad lists resulted in declines of $5 to $7 for those grades. No. 1 heavy melting scrap sold for $57 a ton, off $7 from the previous week. A similar $7 per ton decrease occurred in cut structurals, punchings and plate scrap.

Philadelphia — Following recent purchases of open-hearth steel scrap by United States Steel Corp. for the Fairless Works, independents are purchasing modest tonnages at the same levels. As of now, the market in general appears fairly stable. This applies particularly to electric furnace bundles, borings and turnings, low phos structurals and plates, railroad specialties, tonnage steel grades and to all cast items.

Bolstering the market on open-hearth scrap is an increasingly heavy demand for export. Two cargoes left this port late in January, and material is being accumulated for at least three more shipments this month. Prices for export, f.o.b. shippers' yards, are higher than those for domestic shipment.

New York—Scrap brokers have reduced their buying prices on several steelmaking grades—more as an overdue price adjustment than as a reaction to a slump in demand. They are offering $55-55.50 on No. 1 heavy melting and No. 1 bundles, a drop of 50 cents in the outside figure. They have reduced prices on secondary grades $1 to $46-47 for No. 2 heavy melting and to $44-45 for No. 2 bundles. Machine shop turnings have been reduced to $34-35, mixed borings and turnings to $35-36 and short shovel turnings to $38-39, a decline of $1 a ton in each case.

Prices on cast grades and stainless steel specialties are unchanged.

Boston—For district consumption, brokers are paying $48.50 a ton for No. 1 heavy melting steel, shipping point. This is $3 a ton under the January purchasing price. Buying this month will be smaller than it was in January, notably in No. 2 grades. Prices for eastern Pennsylvania shipment have leveled off after recent declines. Export buying is slower.

Chicago — Small purchases of scrap are sufficient to continue the orderly settling of the market to a more realistic price level.

To illustrate the extent of the readjustment, No. 1 heavy melting steel of industrial origin has dropped $17 a ton from the December peak; No. 1 factory bundles, $20; rerolling rails, $22. There is no indication that the decline has been arrested. Actually, this district is making as much or more steel than it did in December. Operating rates have dropped because of the upward revision in the capacity figure. There is some likelihood that output may slacken a little in the second and third quarters. This prospect may be exerting a strong pressure on the scrap market.

Detroit—The scrap market is weak here. No. 1 grades are off another $1 a ton, and may slip still lower by the end of the month. The cast iron grades are holding, but there are signs of a decline. There is little trading currently.

Buffalo—Scrap dropped an average of $6 a ton here when a major consumer bought No. 2 heavy melting at $47, and No. 2 bundles at $43. No. 1 heavy melting was marked down to $53-54.

Price reductions also were posted on No. 1 bundles, machine shop turnings, short shoveling turnings, railroad specialties and low phos.

The local market is expected to find at least temporary support at the newly established levels. But most observers think prices will continue under downward pressure for some time.

The cast iron grades have not reflected the decline in the steel grades.

Youngstown—A large steel producer here has placed an order for No. 1 heavy melting steel scrap at $54 a ton. This represents a drop of $12 to $14 a ton from the highest prices paid late last year. Another producer bought No. 2 heavy melting at $50 and bundles at $45.

Cincinnati—A major area buyer entered the market last week, sending prices down. No. 1 heavy melting is being quoted at $51-52, brokers' buying price, off $5 from the week-ago level. Other grades

(*Please turn to page* 163)

Iron and Steel Scrap

Consumer prices, per gross ton, except as otherwise noted, including broker's commission, as reported to STEEL. *Changes shown in italics.*

STEELMAKING SCRAP COMPOSITE

Feb. 6	$55.17
Jan. 30	56.00
Jan. Avg.	58.96
Feb. 1956	48.96
Feb. 1952	43.00

Based on No. 1 heavy melting grade at Pittsburgh, Chicago and eastern Pennsylvania.

PITTSBURGH

No. 1 heavy melting	54.00-55.00
No. 2 heavy melting	48.00-49.00
No. 1 bundles	54.00-55.00
No. 2 bundles	*44.00-45.00*
No. 1 busheling	54.00-55.00
Machine shop turnings	*38.00-39.00*
Mixed borings, turnings	*38.00-39.00*
Short shovel turnings	*42.00-43.00*
Cast iron borings	*42.00-43.00*
Cut structurals, 3 ft. lengths	*59.00-60.00*
Cut structurals, 2 ft. and under	*61.00-62.00*
Heavy turnings	*49.00-50.00*
Punchings & plate scrap	*59.00-60.00*
Electric furnace bundles	*59.00-60.00*

Cast Iron Grades

No. 1 cupola	*52.00-53.00*
Heavy breakable cast	50.00-51.00
Unstripped motor blocks	40.00-41.00
No. 1 machinery cast	60.00-61.00

Railroad Scrap

No. 1 R.R. heavy melt	*56.00-57.00*
Rails, 2 ft and under	*71.00-72.00*
Rails, 18 in. and under	*72.00-73.00*
Rails, random lengths	*69.00-70.00*
Railroad specialties	*66.50-67.50*

Stainless Steel Scrap

18-8 bundles & solids	500.00-540.00
18-8 turnings	420.00-440.00
430 bundles & solids	110.00-120.00
430 turnings	80.00-85.00

CLEVELAND

No. 1 heavy melting	*51.00-52.00*
No. 2 heavy melting	46.00-47.00
No. 1 bundles	*51.00-52.00*
No. 2 bundles	40.00-41.00
No. 1 busheling	*51.00-52.00*
Machine shop turnings	33.00-34.00
Mixed borings, turnings	*35.00-36.00*
Short shovel turnings	*35.00-36.00*
Cast iron borings	*35.00-36.00*
Cut foundry steel	*54.00-55.00*
Cut structurals plates 2 ft and under	59.00-60.00
Alloy free, short shovel turnings	*39.00-40.00*
Electric furnace bundles	*52.00-53.00*

Cast Iron Grades

No. 1 cupola	*53.00-54.00*
Charging box cast	*42.00-43.00*
Heavy breakable cast	*42.00-43.00*
Stove plate	*49.00-50.00*
Unstripped motor blocks	*35.00-36.00*
Brake shoes	*42.00-43.00*
Clean auto cast	*52.00-53.00*
Burnt cast	*40.00-41.00*
Drop broken machinery	*55.00-56.00*

Railroad Scrap

No. 1 R.R. heavy melt	*53.00-54.00*
R.R. malleable	*61.00-62.00*
Rails, 2 ft and under	*76.00-77.00*
Rails, 18 in. and under	*77.00-78.00*
Rails, random lengths	*71.00-72.00*
Cast steel	*64.00-65.00*
Railroad specialties	*67.00-68.00*
Uncut tires	*66.00-67.00*
Angles, splice bars	*66.00-67.00*
Rails, rerolling	*75.00-76.00*

Stainless Steel

(Brokers' buying prices; f.o.b. shipping point)

18-8 bundles, solids	450.00-500.00
18-8 turnings	300.00-310.00
430 clips, bundles, solids	100.00-105.00
430 turnings	45.00-50.00

YOUNGSTOWN

No. 1 heavy melting	*53.00-54.00*
No. 2 heavy melting	49.00-50.00
No. 1 bundles	*53.00-54.00*
No. 2 bundles	43.00-44.00
No. 1 busheling	*53.00-54.00*
Machine shop turnings	34.00-35.00
Short shovel turnings	*38.00-39.00*
Cast iron borings	*38.00-39.00*
Low phos.	*54.00-55.00*
Electric furnace bundles	*54.00-55.00*

Railroad Scrap

No. 1 R.R. heavy melt	*55.00-56.00*

CHICAGO

No. 1 hvy melt, indus	*53.00-54.00*
No. 1 hvy melt, dealer	*50.00-51.00*
No. 2 heavy melting	43.00-44.00
No. 1 factory bundles	*54.00-55.00*
No. 1 dealer bundles	*51.00-52.00*
No. 2 bundles	40.00-41.00
No. 1 busheling, indus	*53.00-54.00*
No. 1 busheling, dealer	*50.00-51.00*
Machine shop turnings	*34.00-35.00*
Mixed borings, turnings	*36.00-37.00*
Short shovel turnings	*36.00-37.00*
Cast iron borings	*36.00-37.00*
Cut structurals, 3 ft	58.00-60.00
Punchings & plate scrap	59.00-61.00

Cast Iron Grades

No. 1 cupola	*46.00-47.00*
Stove plate	*42.00-43.00*
Unstripped motor blocks	*34.00-35.00*
Clean auto cast	*51.00-52.00*
Drop broken machinery	*51.00-52.00*

Railroad Scrap

No. 1 R.R. heavy melt	*56.00-57.00*
R.R. malleable	*60.00-61.00*
Rails, 2 ft and under	*72.00-74.00*
Rails, 18 in. and under	*73.00-75.00*
Angles, splice bars	*62.00-63.00*
Rails, rerolling	*70.00-72.00*

Stainless Steel Scrap

18-8 bundles & solids	510.00-525.00
18-8 turnings	355.00-375.00
430 bundles & solids	105.00-110.00
430 turnings	65.00-70.00

DETROIT

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*43.00-44.00*
No. 2 heavy melting	*37.00-38.00*
No. 1 bundles	*43.00-44.00*
No. 2 bundles	*32.00-33.00*
No. 1 busheling	*43.00-44.00*
Machine shop turnings	27.00-29.00
Mixed borings, turnings	28.00-30.00
Short shovel turnings	29.00-30.00
Punchings & plate scrap	56.00-57.00

Cast Iron Grades

No. 1 cupola	51.00
Charging box cast	44.00
Stove plate	45.00
Heavy breakable	44.00
Unstripped motor blocks	32.00
Clean auto cast	55.00
Malleable	56.00

ST. LOUIS

(Brokers' buying prices)

No. 1 heavy melting	49.00
No. 2 heavy melting	46.50
No. 1 bundles	49.00
No. 2 bundles	40.50
No. 1 busheling	49.00
Machine shop turnings	36.00†
Short shovel turnings	39.00†

Cast Iron Grades

No. 1 cupola	47.00
Charging box cast	40.00
Heavy breakable cast	40.00
Unstripped motor blocks	40.00
Brake shoes	51.00
Clean auto cast	50.50
Stove plate	41.00

Railroad Scrap

No. 1 R.R. heavy melt.	56.00
Rails, 18 in. and under	76.00
Rails, rerolling	76.00†
Rails, random lengths	65.00
Angles, splice bars	66.00

†Nominal.

PHILADELPHIA

No. 1 heavy melting	59.00
No. 2 heavy melting	50.00
No. 1 bundles	59.00
No. 2 bundles	48.50
No. 1 busheling	59.00
Electric furnace bundles	61.00
Mixed borings, turnings	44.00
Machine shop turnings	42.00-43.00
Short shovel turnings	46.00-47.00
Heavy turnings	54.00
Structurals & plates	63.00-64.00
Couplers, springs, wheels	73.00†
Rails, crops, 2 ft & under	80.00-82.00

Cast Iron Grades

No. 1 cupola	54.00-56.00
Malleable	67.00-68.00†
Heavy breakable cast	59.00
Drop broken machinery	60.00-61.00

†Nominal.

NEW YORK

(Brokers' buying prices)

No. 1 heavy melting	*55.50*
No. 2 heavy melting	*46.00-47.00*
No. 1 bundles	*55.00-55.50*
No. 2 bundles	*44.00-45.00*
Machine shop turnings	*34.00-35.00*
Mixed borings, turnings	*35.00-36.00*
Short shovel turnings	*38.00-39.00*
Low phos. (structural & plate	58.00-59.00

Cast Iron Grades

No. 1 cupola	46.00-47.00
Unstripped motor blocks	39.00-40.00
Heavy breakable	50.50-51.50

Stainless Steel

18-8 sheets, clips, solids	475.00-485.00
18-8 borings, turnings	345.00-370.00
430 sheets, clips, solids	110.00-115.00
410 sheets, clips, solids	100.00-105.00

BOSTON

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	48.00-48.50
No. 2 heavy melting	38.50-39.50
No. 1 bundles	48.00-48.50
No. 2 bundles	37.50-38.00
No. 1 busheling	48.00-48.50
Machine shop turnings	30.00-31.00
Mixed borings, turnings	31.00-32.00
Short shovel turnings	34.00-35.00
No. 1 cast	44.00-45.00
Mixed cupola cast	42.00-43.00
No. 1 machinery cast	44.00-45.00

BUFFALO

No. 1 heavy melting	*53.00-54.00*
No. 2 heavy melting	*46.00-47.00*
No. 1 bundles	*53.00-54.00*
No. 2 bundles	*42.00-43.00*
No. 1 busheling	*53.00-54.00*
Mixed borings, turnings	36.00-37.00
Machine shop turnings	*33.00-34.00*
Short shovel turnings	*37.00-38.00*
Cast iron borings	*36.00-37.00*
Low phos.	*59.00-60.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	49.00-50.00
No. 1 machinery	54.00-55.00

Railroad Scrap

Rails, random lengths	68.00-69.00
Rails, 3 ft and under	70.00-71.00
Railroad specialties	*59.00-60.00*

CINCINNATI

(Brokers' buying prices; f.o.b. shipping point)

No. 1 heavy melting	*51.00-52.00*
No. 2 heavy melting	*43.00-44.00*
No. 1 bundles	*51.00-52.00*
No. 2 bundles	*38.00-39.00*
No. 1 busheling	*51.00-52.00*
Machine shop turnings	*34.00-35.00*
Mixed borings, turnings	*34.00-35.00*
Short shovel turnings	*36.00-37.00*
Cast iron borings	*33.50-34.50*
Low phos. 18 in.	*57.00-58.00*

Cast Iron Grades

No. 1 cupola	*44.00-45.00*
Heavy breakable cast	*44.00-45.00*
Charging box cast	*44.00-45.00*
Drop broken machinery	*55.00-56.00*

Railroad Scrap

No. 1 R.R. heavy melt	*56.00-57.00*
Rails, 18 in. and under	*73.00-74.00*
Rails, random lengths	*63.00-64.00*

BIRMINGHAM

No. 1 heavy melting	*44.00-45.00*
No. 2 heavy melting	41.00-42.00
No. 1 bundles	*44.00-45.00*
No. 2 bundles	36.00-37.00
No. 1 busheling	*44.00-45.00*
Cast iron borings	27.00-28.00
Short shovel turnings	*35.00-36.00*
Machine shop turnings	*34.00-35.00*
Bar crops and plate	57.00-58.00
Structural & plate, 2 ft.	57.00-58.00
Electric furnace bundles	52.00-53.00
Electric furnace, 2 ft & under	*50.00-51.00*

Cast Iron Grades (F.o.b. shipping point)

No. 1 cupola	53.00-54.00
Stove plate	51.00-52.00
Unstripped motor blocks	44.00-45.00
Charging box cast	40.00-41.00
No. 1 wheels	45.00-46.00

Railroad Scrap

No. 1 R.R. heavy melt.	53.00-54.00
Rails, 18-in. and under	*66.00-67.00*
Rails, rerolling	*61.00-62.00*
Rails, random lengths	64.00-65.00
Angles, splice bars	63.00-64.00

SEATTLE

No. 1 heavy melting	*54.00-55.00*
No. 2 heavy melting	*51.00*
No. 1 bundles	*51.00*
No. 2 bundles	*31.00-34.00*
Machine shop turnings	30.00-33.00
Mixed borings, turnings	30.00-33.00
Electric furnace No. 1	62.00-65.00

Cast Iron Grades

No. 1 cupola	54.00-56.00
Heavy breakable cast	48.00-50.00
Unstripped motor blocks	*45.00-47.00*
Stove plate (f.o.b. plant)	42.00-43.00

LOS ANGELES

No. 1 heavy melting	*59.00*
No. 2 heavy melting	*57.00*
No. 1 bundles	*58.00*
No. 2 bundles	*40.00*
Machine shop turnings	*38.00*

Cast Iron Grades

(F.o.b. shipping point)

No. 1 cupola	*60.00*

SAN FRANCISCO

No. 1 heavy melting	*55.00*
No. 2 heavy melting	*50.00*
No. 1 bundles	*54.00*
No. 2 bundles	*38.00*
Machine shop turnings	*35.00*
Mixed borings, turnings	*35.00*
Cast iron borings	*35.00*
Heavy turnings	*35.00*
Short shovel turnings	*37.00*
Cut structurals, 3 ft	63.00

Cast Iron Grades

No. 1 cupola	60.00
Charging box cast	47.00-49.00
Stove plate	48.00
Heavy breakable cast	42.00
Unstripped motor blocks	50.00
Clean auto cast	60.00
No. 1 wheels	50.00
Drop broken machinery	62.00

HAMILTON, ONT.

No. 1 heavy melting	*50.00*
No. 2 heavy melting	*44.00*
No. 1 bundles	*50.00*
No. 2 bundles	*38.00*
Mixed steel scrap	*42.00*
Busheling, new factory:	
Prepared	*48.00*
Unprepared	*44.00*
Short steel turnings	*31.00*

Cast Iron Grades†

No. 1 machinery cast	50.00

†F.o.b., Hamilton, Ont.

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Copper Prices Fall

Look for the U.S. primary price quotation to continue to drop until it reaches the 30 cent a pound mark. The price could stabilize at this level if labor peace continues

Nonferrous Metal Prices, Pages 162 & 163

ADEQUATE COPPER supplies plus price reductions may make the red metal more attractive to makers of fabricated products.

The price may be heading for the 30 cents a pound level. During the last ten days, Phelps Dodge Corp. initiated a price reduction, bringing the primary quotation to 34 cents a pound. Kennecott Copper Corp. and Anaconda Co. followed. Domestic custom smelters are reported willing to sell substantial tonnage orders for 33 cents a pound, possibly 32.50 cents a pound.

Kicker—The U.S. must import about one-third of its copper. This means that for supply to be in adequate balance most world mines must operate continually during '57. The U.S. has three-year labor contracts. Chile has its new pay and fringe benefit program for '57, but with the mines being controlled by the government, there is always the possibility of a work stoppage during the year. The Rhodesian mines, still fighting racial problems, can shut down with little forewarning. But overall, the labor outlook is more peaceful than it has been for several years.

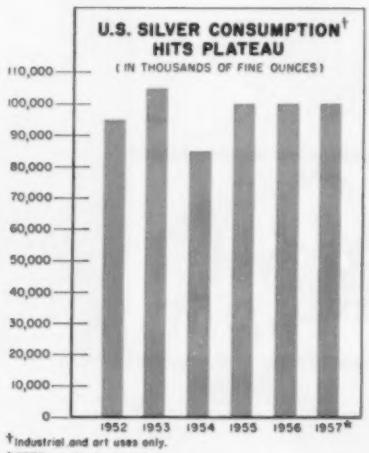
Aluminum Fabricators Fret

Independent extruders and diecasters are concerned about what is happining to the price of end products. Some panic over growing inventories has caused some mills to slash extrusion prices. Job shop diecasters are following suit. Result: Small independents are struggling to meet competition.

Aluminum is in loose supply momentarily. But says one aluminum sales manager: "We have to have the extra supply to get more aluminum usage. What happens if two or three mass produced items turn to aluminum? It would put supply behind demand again."

'57 Silver Outlook

The arts and industries in the U.S. consumed 100 million fine ounces of silver in 1956, reports



†Industrial and art uses only.
*STEEL estimate.
Source: Handy & Harman.

Handy & Harman. More than 50 per cent went for industrial uses. The introduction of a wide variety of silver in new forms and alloys to serve the electrical and electronics fields accounted for the largest percentage gains. More silver is being used in brazing alloy. Total consumption (see chart) showed no increase last year over 1955 results as art uses (particularly sterling and plated ware) declined. U.S. consumption in '57 should parallel last year's.

Zirconium Progress

Reactive Metals Inc. has been formed by Mallory-Sharon Titanium Corp. and National Distillers Products Corp. The new rolling mill (to be constructed at Ashtabula, O.) will be used for melting zirconium and its alloys for the manufacture of certain zirconium mill products. By July 1, U.S. Industrial Chemical Co., division of National Distillers, plans to be producing 83,000 lb of zirconium sponge a month. Its new reduction facility will operate at an annual rate of 2 million lb. The Atomic Energy Commission has contracted for 1 million lb a year. Reactive Metals Inc. will be operated as an independent rolling mill.

Tin Price Problems

One New York dealer is quoting tin at 97.50 cents a pound for May delivery and finding no takers. But he has created a problem: Based on Straits and Singapore quotations, it will cost east coast dealers 98.50 cents a pound to get May shipments to New York docks. The dealer is betting on a reduction of Far East tin quotations. Other dealers are sitting on the sidelines. Tin platers are, too. They have inventories which can carry them for 45 to 60 days and are in no hurry to make purchases.

NONFERROUS PRICE RECORD

	Price Feb. 6	Last Change	Previous Price	Jan. Avg.	Dec. Avg.	Feb., 1956 Avg.
Aluminum ..	27.10	Aug. 10, 1956	25.90	27.100	27.100	24.400
Copper	33.00–34.00	Feb. 5, 1957	34.00	35.433	35.650	48.076
Lead	15.80	Jan. 13, 1956	16.30	15.800	15.800	15.800
Magnesium .	35.25	Aug. 13, 1956	33.75	35.250	35.250	32.500
Nickel	74.00	Dec. 6, 1956	64.50	74.000	70.880	64.500
Tin	102.75	Feb. 6, 1957	103.00	101.480	104.465	100.906
Zinc	13.50	Jan. 6, 1956	13.50	13.500	13.500	13.500

Quotations in cents per pound based on: COPPER, deld. Conn. Valley; LEAD, common grade, deld. St. Louis; ZINC, prime western, E. St. Louis; TIN, Straits, deld. New York; NICKEL, electrolytic cathodes, 99.9%, base size at refinery, unpacked; ALUMINUM, primary ingots, 99 + %, deld.; MAGNESIUM, pig, 99.8%, Velasco, Tex.

$21 for a sales call —but how many dollars worth of SELL?

Recent surveys show that the average cost of a sales call is approximately $21. Costs in your company may be somewhat more or somewhat less—but the important question is "How much SELL are you getting for your sales call dollar?"

You are not getting full value unless you are giving industrial advertising a chance to do its proper share of the sales job—making continual contacts, arousing interest, creating preference for your company and its products.

If advertising is doing this part of the job, your salesmen can concentrate on the "climax steps" of selling—showing the prospect what your products will do for him, and getting his order.

The salesman always "carries the ball," but he gains more ground when a well-balanced advertising program "runs interference" for him.

NATIONAL INDUSTRIAL ADVERTISERS ASSOCIATION, INC.

271 Madison Avenue, New York 16, N. Y.

An organization of over 4000 members engaged in the advertising and marketing of industrial products, with local chapters in ALBANY, BALTIMORE, BOSTON, BUFFALO, CHICAGO, CLEVELAND, COLUMBUS, DALLAS-FORT WORTH, DENVER, DETROIT, HAMILTON, ONT., HARTFORD, HOUSTON, INDIANAPOLIS, LOS ANGELES, MILWAUKEE, MINNEAPOLIS-ST. PAUL, MONTREAL, QUE., NEWARK, NEW YORK, PHILADELPHIA, PITTSBURGH, PORTLAND, ROCHESTER, ROCKFORD, ST. LOUIS, SAN FRANCISCO, TORONTO, ONT., YOUNGSTOWN.

Nonferrous Metals

Cents per pound, carlots except as otherwise noted.

PRIMARY METALS AND ALLOYS

Aluminum: 99+%, ingots 27.10; pigs, 25.00, 10,000 lb or more, f.o.b. shipping point. Freight allowed on 500 lb or more.

Aluminum Alloy: No. 13, 28.90; No. 43, 28.70; No. 195, 30.30; No. 214, 30.50; No. 356, 28.90. 30-lb ingots.

Antimony: R.M.M. brand, 99.5%, 33.00; Lone Star brand, 33.50, f.o.b. Laredo, Tex., in bulk. Foreign brands, 99.5%, 27.50-28.00, New York, duty paid, 10,000 lb or more.

Beryllium: 97%, lump or beads, $71.50 per lb, f.o.b. Cleveland or Reading, Pa.

Beryllium Aluminum: 5% Be, $74.75 per lb of contained Be, with balance as Al at market price, f.o.b. shipping point.

Beryllium Copper: 3.75-4.25% Be, $43 per lb of contained Be, with balance as Cu at market price on shipment date, f.o.b. shipping point.

Bismuth: $2.25 per lb ton lots.

Cadmium: Sticks and bars, $1.70 per lb deld.

Cobalt: 97-99%, $2.35 per lb for 550-lb keg; $2.37 per lb for 100-lb case; $2.42 per lb under 100 lb.

Columbium: Powder, $119.20 per lb, nom.

Copper: Electrolytic, 34.00 deld. Conn. valley; 34.00 deld. Midwest; custom smelters, 33.00-34.00 deld.; lake, 34.00 deld.; fire refined, 33.75 deld.

Germanium: First reduction, $201.85-$220 per lb; intrinsic grade, $220-$242.67 per lb, depending on quantity.

Gold: U.S. Treasury, $35 per oz.

Indium: 99.9%, $2.25 per troy oz.

Iridium: $100-$110 nom. per troy oz.

Lead: Common, 15.80; chemical, 15.90; corroding, 15.90, St. Louis. New York basis, add 0.20.

Lithium: 98+%, cups or ingots, $11.50; rod, $13.50; shot or wire, $14.50, f.o.b. Minneapolis, 100 lb lots.

Magnesium: Pig, 35.25; ingot, 36.00, f.o.b. Velasco, Tex. 13 in. sticks, 59.00, f.o.b. Madison, Ill.

Magnesium Alloys: AZ91B (diecasting), 37.25 deld.; AZ63A, AZ92A, AZ91C (sand casting), 40.75, f.o.b. Velasco, Tex.

Mercury: Open market, spot, New York, $255-$257 per 76-lb flask.

Molybdenum: Extruded ingot, $9.60 per pound, f.o.b. Detroit.

Nickel: Electrolytic cathodes, sheets (4 x 4 in. and larger), unpacked, 74.00; 10-lb pigs, unpacked, 78.25; "XX" nickel shot, 79.50; "F" nickel shot or ingots for addition to cast iron, 74.50; prices f.o.b. Port Colborne, Ont., including import duty. New York basis, add 1.01.

Osmium: $80-$100 per troy oz, nom.

Palladium: $23-$24 per troy oz.

Platinum: $98-$101 per troy oz from refineries.

Radium: $16-$21.50 per mg radium content, depending on quantity.

Rhodium: $118-$125 per troy oz.

Ruthenium: $45-$55 per troy oz.

Selenium: 99.5%, $12.00-$15.00 per lb.

Silver: Open market, 91.375 per troy oz.

Sodium: 16.50, c.l.; 17.00, l.c.l.

Tantalum: Sheet, rod, $68.70 per lb; powder, $56.63 per lb.

Tellurium: $1.65 per lb.

Thallium: $12.50 per lb.

Tin: Straits, N.Y., spot, 102.50; prompt, 102.25.

Titanium: Sponge, 99.3+%, grade A-1 ductile (0.3% Fe max), $2.75; grade A-2 (0.5% Fe max), $2.50 per pound.

Tungsten: Powder, 98.8%, carbon reduced, 1000-lb lots, $4.20 per lb nom., f.o.b. shipping point; less than 1000 lb, add 15.00; 99+% hydrogen reduced, $5. Treated ingot, $6.70.

Zinc: Prime Western, 13.50; brass special, 13.75; intermediate, 14.00, East St. Louis, freight allowed over 0.50 per pound. New York basis, add 0.50. High grade, 14.85; special high grade, 15.25 deld. Die casting alloy ingot No. 3, 18.00; No. 2, 19.00; No. 5, 18.50 deld.

Zirconium: Ingots, commercial grade, $14.40 per lb; low-hafnium reactor grade, $23.07. Sponge, commercial grade, $10 per lb; reactor grade, $14-$22 per lb, depending on quantity. Powder electronics grades, $15 per lb; flash grade, $11.50.

(Note: Chromium, manganese and silicon metals are listed in ferroalloy section.)

SECONDARY METALS AND ALLOYS

Aluminum Ingot: Piston alloys, 23.25-28.75; No. 12 foundry alloy (No. 2 grade), 23.00-23.25; 5% silicon alloy, 0.60 Cu max, 24.25-25.50; 13 alloy, 0.60 Cu max, 24.25-25.50; 195 alloy, 24.00-26.25; 108 alloy, 22.00-23.00. Steel deoxidizing grades, notch bars, granulated or shot: Grade 1, 22.75; grade 2, 21.50; grade 3, 20.50; grade 4, 19.75.

Brass Ingot: Red brass, No. 115, 32.50; tin bronze, No. 225, 42.00; No. 245, 37.00; high-leaded tin bronze, No. 305, 36.25; No. 1 yellow, No. 405, 25.75; manganese bronze, No. 421, 29.00.

Magnesium Alloy Ingot: AZ63A, 37.50; AZ91B, 37.50; AZ91C, 37.50; AZ92A, 37.50.

NONFERROUS PRODUCTS

BERYLLIUM COPPER

(Base prices per lb, plus mill extras, 2000 to 5000 lb; nominal 1.9% Be alloy.) Strip, $1.86-$1.91, f.o.b. Temple, Pa., or Reading, Pa.; rod, bar, wire, $1.88, f.o.b. Temple, Pa.

COPPER WIRE

Bare, soft, f.o.b. eastern mills, 30,000-lb lots, 39.355; l.c.l., 39.98. Weatherproof, 30,000-lb lots, 39.28; l.c.l., 40.03. Magnet wire deld., 15,000 lb or more, 46.68; l.c.l., 47.43.

LEAD

(Prices to jobbers, f.o.b. Buffalo, Cleveland, Pittsburgh.) Sheets, full rolls, 140 sq ft or more, $21.50 per cwt; pipe, full coils, $21.50 per cwt; traps and bends, list prices plus 30%.

TITANIUM

(Prices per lb, 10,000 lb and over, f.o.b. mill.) Sheets and strip, $11.00-$14.75; sheared mill plate, $9.25-$11.25; wire, $8.50-$11.00; forging billets, $6.85-$7.10; hot-rolled and forged bars, $7.10-$7.35.

ZINC

(Prices per lb, c.l., f.o.b. mill.) Sheets, 24.00; ribbon zinc in coils, 21.50; plates, 20.00.

ZIRCONIUM

Plate, $20.35; H.R. strip, $23.95; C.R. strip, $32.00; forged or H.R. bars, $18.40; wire, 0.015 in., 8.00c per linear foot.

NICKEL, MONEL, INCONEL

	"A" Nickel	Monel	Inconel
Sheets, C.R.	126	106	128
Strip, C.R.	124	108	138
Plate, H.R.	120	105	121
Rod, Shapes, H.R.	107	89	109
Seamless Tubes	157	129	200

ALUMINUM

Sheet and Circles: 1100 and 3003 mill finish (30,000 lb base; freight allowed)

Thickness Range, Inches	Flat Sheet	Coiled Sheet
0.249-0.136	40.90-45.40	....
0.135-0.096	41.40-46.50	37.70-39.80
0.095-0.077	42.10-48.30	37.80-39.80
0.076-0.061	42.70-50.60	38.20-40.50
0.060-0.048	43.40-52.90	38.80-41.50
0.047-0.038	43.90-55.60	38.60-42.90
0.037-0.030	44.30-50.00	40.40-44.70
0.029-0.024	44.90-52.40	41.00
0.023-0.019	45.80-52.20	42.00
0.018-0.017	46.60-53.30	42.60
0.016-0.015	47.50-53.90	43.40
0.014	48.50-50.90	44.40
0.013-0.012	49.70-52.10	45.10
0.011	50.70-53.70	46.30
0.010-0.0095	52.10-54.40	47.60
0.009-0.0085	53.40	49.10
0.008-0.0075	55.00	50.03
0.007	56.50	51.80
0.006	58.10	53.20

ALUMINUM (continued)

Plates and Circles: Thickness 0.250-3 in., 24-60 in. width or diam., 72-240 in. lengths.

Alloy	Plate Base	Circle Base
1100-F, 3003-F	40.2	44.5
5050-F	41.3	45.6
3004-F	42.3	47.5
5052-F	42.9	48.2
6061-T6	44.4	50.0
2024-T4*	48.1	54.4
7075-T6*	55.4	62.5

*24-48 in. widths or diam., 72-180 lengths.

Screw Machine Stock: 30,000 lb base.

Diam., (in.) or across flats	Round 2011-T3	Round 2017-T4	Hexagonal 2011-T3	Hexagonal 2017-T4
Drawn				
0.125	74.30	71.50	....	....
0.156-0.172	63.00	60.40	....	....
0.188	63.00	60.40	....	76.40
0.219-0.234	59.70	57.20	....	....
0.250-0.281	59.70	57.20	....	73.00
0.313	59.70	57.20	....	69.60
0.344	58.50	....	....	....
Cold-finished				
0.375-0.547	58.80	57.50	70.10	65.50
0.563-0.688	58.80	57.50	66.70	61.60
0.750-1.000	57.40	56.00	61.00	58.10
1.063	57.40	56.00	....	56.10
1.125-1.500	55.20	53.90	59.00	56.10
Rolled				
1.563	53.70	52.40	....	....
1.625-2.000	53.10	51.60	....	....
2.125-2.500	51.70	50.30	....	....
2.563-3.375	50.20	48.70	....	....

Forging Stock: Round, Class 1, 43.30-55.90 in specific lengths 36-144 in., diameters 0.375-8 in. Rectangles and squares, Class 1, 48.10-63.20 in random lengths, 0.375-4 in. thick, width 0.750-10 in.

Pipe: ASA schedule 40, alloy 6063-T6, standard lengths, plain ends, 90,000-lb base, per 100 ft.

Nom. Pipe Size (in.)		Nom. Pipe Size (in.)	
¾	$18.45	2	$ 57.00
1	29.00	4	157.20
1¼	39.25	6	281.65
1½	46.95	8	423.80

Extruded Solid Shapes:

Factor	Alloy 6063-T5	Alloy 6062-T6
9-11	45.90-47.50	61.50-65.80
12-14	46.20-47.70	62.20-66.80
15-17	46.40-48.30	63.50-68.50
18-20	47.00-48.80	65.50-71.10

MAGNESIUM

Sheet and Plate: AZ31B standard grade, 0.32 in., 103.10; .081 in., 77.90; .125 in., 70.40; .188 in., 69.00; .250-2.0 in., 67.90. AZ31B spec. grade, .032 in., 171.30; .081 in., 108.70; .125 in., 98.10; .188 in., 95.70; .250-2.0 in., 93.30. Thread plate, .188 in., 71.70; .250-2.0 in., 70.60; Tooling plate, .250-3.0 in., 73.00.

Extruded Solid Shapes:

Factor	Com. Grade (AZ31C)	Spec. Grade (AZ31B)
6-8	69.60-72.40	84.60-87.40
12-14	70.70-73.00	85.70-88.00
24-26	75.60-76.30	90.60-91.30
36-38	89.20-90.30	104.20-105.30

NONFERROUS SCRAP

DEALER'S BUYING PRICES

(Cents per pound, New York, in ton lots)

Aluminum: 1100 clippings, 13.00-13.50; old sheets, 8.00-8.50; borings and turnings, 6.00-

BRASS MILL PRICES

	MILL PRODUCTS a				SCRAP ALLOWANCES f		
	Sheet, Strip, Plate	Rod	Wire	Seamless Tube	Clean Heavy	Rod Ends	Clean Turnings
Copper	56.13b	53.36c	....	56.32	30.000	30.000	29.250
Yellow Brass	48.85	38.93d	49.39	51.76	23.250	23.000	21.375
Low Brass, 80%	51.80	51.74	52.34	54.61	25.750	25.500	25.000
Red Brass, 85%	52.84	52.78	53.38	55.65	26.750	26.500	26.000
Com. Bronze, 90%	54.43	54.37	54.97	56.99	27.750	27.750	27.000
Manganese Bronze	56.66	50.76	....	....	21.750	21.500	21.000
Muntz Metal	50.99	46.80	....	....	22.000	21.750	21.250
Naval Brass	52.92	47.23	....	56.33	21.750	21.500	21.000
Silicon Bronze	60.52	59.71	60.56	62.64	29.375	29.125	28.375
Nickel Silver, 10%	65.36	....	....	....	29.500	29.250	14.750
Phos. Bronze, A 5%	75.22	75.72	....	....	31.000	30.750	29.750

a. Cents per lb, f.o.b. mill; freight allowed on 500 lb or more. b. Hot-rolled. c. Cold-drawn. d. Free cutting. e. 3% silicon. f. Prices in cents per lb for less than 20,000 lb, f.o.b. shipping point. On lots over 20,000 lb at one time, of any or all kinds of scrap, add 1 cent per lb. g. Leaded

6.50; crankcase, 8.00-8.50; industrial castings, 8.00-8.50.

Copper and Brass. No. 1 heavy copper and wire, 24.50-25.00, No. 2 heavy copper and wire, 23.00-23.50; light copper, 20.50-21.00; No. 1 composition red brass, 22.50-23.00; No. 1 composition turnings, 21.50-22.00; yellow brass turnings, 12.50-13.00; new brass clippings, 20.00-20.50; light brass, 13.00-13.50; heavy yellow brass, 15.00-15.50; new brass rod ends, 17.50-18.00; auto radiators, unsweated, 16.00-16.50; cocks and faucets, 17.00-17.50; brass pipe, 17.50-18.00.

Lead: Heavy, 12.50-13.00; battery plates, 6.50-7.00; linotype and stereotype, 13.00-14.00; electrotype, 12.50-13.00; mixed babbitt, 13.00-13.50.

Monel: Clippings, 80.00-85.00; old sheets, 75.00-80.00; turnings, 65.00-75.00; rods, 80.00-90.00.

Nickel: Sheets and clips, 150.00-185.00; rolled anodes, 150.00-185.00; turnings, 135.00-160.00; rod ends, 150.00-185.00.

Zinc: Old zinc, 4.50-5.00; new die-cast scrap, 3.75-4.00; old die-cast scrap, 2.25-2.50.

REFINERS' BUYING PRICES

(Cents per pound, carlots, delivered refinery)

Aluminum: 1100 clippings, 17.00; 3003 clippings, 17.00; 6151 clippings, 17.00; 5052 clippings, 16.50-17.00; 2014 clippings, 16.00-16.50; 2017 clippings, 16.00-16.50; 2024 clippings, 16.00-16.50; mixed clippings, 16.00; old sheets, 14.00; old cast, 14.00; clean old cable (free of steel), 16.00-17.00; borings and turnings, 14.00-15.00.

Beryllium Copper: Heavy scrap, 0.020-in. and heavier, not less than 1.5% Be, 58.00; light scrap, 54.00; turnings and borings, 38.00

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 25.00; light copper, 22.75; refinery brass (60% copper) per dry copper content, 24.00.

INGOTMAKERS' BUYING PRICES

(Cents per pound, carlots, delivered)

Copper and Brass: No. 1 heavy copper and wire, 26.50; No. 2 heavy copper and wire, 25.00; light copper, 22.75; No. 1 composition borings, 23.00; No. 1 composition solids, 23.50; heavy yellow brass solids, 15.00; yellow brass turnings, 14.00; radiators, 17.50.

PLATING MATERIAL

(F.o.b. shipping point, freight allowed on quantities)

ANODES

Cadmium: Special or patented shapes, $1.70 per lb.

Copper: Flat-rolled, 52.79; oval, 51.92, 5000-10,000 lb; electrodeposited, 43.78; 2000-5000 lb lots; cast, 46.04, 5000-10,000 lb quantities.

Nickel: Depolarized, less than 100 lb, $1.015; 100-499 lb, 99.50; 500-4999 lb, 95.50; 5000-29,999 lb, 93.50; 30,000 lb, 91.50. Carbonized, deduct 3 cents a lb.

Tin: Bar or slab; less than 200 lb, 121.50; 200-499 lb, 120.00; 500-999 lb, 119.50; 1000 lb or more, 119.00.

Zinc: Balls, 21.00; flat tops, 21.00; flats, 22.75; ovals, 22.00, ton lots.

CHEMICALS

Cadmium Oxide: $1.70 per lb, in 100-lb drums.

Chromic Acid: 100 lb, 33.20; 500 lb, 32.70; 2000 lb, 32.05; 5000 lb, 31.75; 10,000 lb, 31.25, f.o.b. Detroit.

Copper Cyanide: 100-1000 lb, 77.50.

Copper Sulphate: 100 lb, 26.65; 200 lb, 23.65; 300 lb, 22.65; 400 lb, 22.15; 500 lb, 20.65; 2000 lb, 18.40; 6000 lb, 18.15; 12,000 lb, 17.90, f.o.b. shipping point.

Nickel Chloride: 100 lb, 48.50; 200 lb, 46.50; 300 lb, 45.50; 400 lb, 43.50; 5000 lb, 41.50; 10,000 lb, 40.50.

Nickel Sulphate: 100 lb, 40.50; 200 lb, 38.50; 300 lb, 37.50; 400 lb, 35.50; 5000 lb, 33.50; 20,000 lb, 33.00; 36,000 lb, 32.50.

Sodium Cyanide: 100 lb, 27.50; 200 lb, 25.80; 400 lb, 22.80; 1000 lb, 21.80, f.o.b. Detroit.

Sodium Stannate: Less than 100 lb, 80.10; 100-600 lb, 70.70; 700-1900 lb, 68.00; 2000-9900 lb, 66.10; 10,000 lb or more, 64.80.

Stannous Chloride (anhydrous): Less than 25 lb, 170.20; 25 lb, 135.20; 100 lb, 120.20; 400 lb, 117.70; 5200-19,600 lb, 105.50; 20,000 lb or more, 93.30.

Stannous Sulphate: Less than 50 lb, 132.70; 50 lb, 102.70; 100-1900 lb, 100.70; 2000 lb or more, 98.70.

Zinc Cyanide: Under 1000 lb, 55.55; 1000 lb and over, 53.55.

(Concluded from page 157)

also reflect the easier tone, but the big decreases are in the prime steelmaking grades. Brokers anticipate another small dip when another local mill enters the market.

Birmingham — Scrap continues dull. Open-hearth grade consumers are out of the market. One large mill is expected to buy shortly; brokers anticipate a price cut of $2 to $3 a ton under its last purchase. Electric furnace grades also are soft. The cast iron grades are firm. Some exporters are buying sparingly.

St. Louis—The scrap market has leveled out. Mills still aren't buying enough to move prices up. Because local mills are operating at or near capacity, dealers see an end to the price decline.

San Francisco — Steel scrap prices were marked down $3 to $7 a ton last week due to declining prices in other markets. Local prices held at the high side for about a week despite a general downtrend in other parts of the nation.

Los Angeles—Scrap prices advanced sharply in the wake of sud-

INDUSTRIAL ENGINEERS

Multi-Million dollar expansion of our operating facilities has created opportunities in industrial engineering for young men trained or experienced in wage incentive programming, methods engineering, and statistical quality control.

1 to 3 years experience will qualify. Professional status assured. Openings at our Fontana plant in Southern California.

Send complete resume to Employment Manager

KAISER STEEL CORP.

P. O. Box 217
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WE CAN HELP YOU TO CONTACT high calibre men to fill specific jobs you have in mind—
Readers of **STEEL** include men of wide training and experience in the various branches of the metalworking industry. When you have an opportunity to offer, use the Help Wanted columns of **STEEL**.

OPENINGS IN TECHNICAL SALES

Recent college graduates in engineering, business administration or liberal arts: or

Men with 3-5 years general experience in production or technical sales: or

Men with longer experience in the application of abrasive products to tool or production engineering:

Leading and expanding company offers promising opportunities in grinding wheel sales. Comprehensive training provided at main plant in Worcester, Massachusetts, before assignment to field location, or headquarters sales engineering.

Positions also open in Refractories and Grinding Machine Sales Engineering.

Send resume to R. W. Cornish Sales Training Supervisor

NORTON

NORTON COMPANY

27 New Bond St. Worcester 6, Mass.

Abrasives

Refractories • Grinding Machines

CLASSIFIED

Help Wanted

METALLURGIST—For producer of stainless steel. Quality control of production of stainless ingots; customer service contacts related to special usage. Plant located on central East Coast. Metallurgical graduate; stainless experience preferred but not essential. Permanent position; good salary with merit increases. In reply please give personal data, education, employment history, salary desired. Box 509, STEEL, Cleveland 13, Ohio.

WANTED: METALLURGIST CAPABLE OF taking complete charge of laboratory supervising melting furnaces in steel foundry producing carbon, low alloy and stainless castings. Should have knowledge of x-ray and magnaflux procedures. Excellent opportunity. Write, giving complete resume and salary expected. Reply Box 511, STEEL, Penton Bldg., Cleveland 13, Ohio.

MAJOR NEW YORK IMPORTER DESIRES man experienced consumer sales of copper, aluminum, steel mill products. Usual company benefits. Salary commensurate experience and ability. Submit resume and salary desired. Box No. 513, STEEL, Penton Bldg., Cleveland 13, Ohio.

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Excellent oppty for expd Steel trader to establish and manage on an incentive basis a ferrous and nonferrous trading dept. dealing with export & import sales for old estab. firm. Salary open. Our employees have knowledge of this ad.
Reply Box 510, STEEL
Penton Bldg. Cleveland 13, Ohio

FOR SALE
SHALCO SHELL MOLDING MACHINE
Model HO-4
Used machine in excellent condition. Complete with standard heater plates and cycle timer. D. C. Hartmas
COVE PATTERN WORKS, INC.
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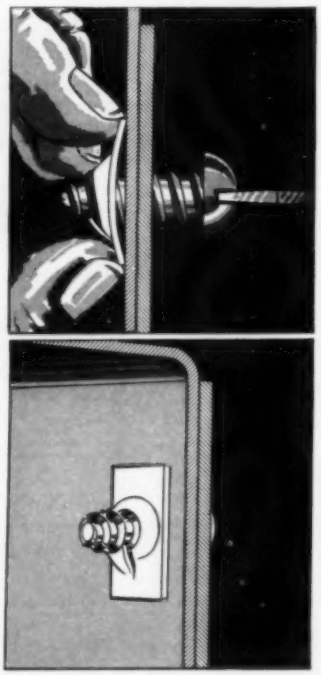
GREAT STRENGTH
FAST ASSEMBLY
LOW COST

PRESTOLE FLAT NUTS

eliminate slow, complicated and costly assembly operations in a multitude of industrial applications. They provide greater holding power—eliminate special tools, threaded nuts, lock washers—cut assembly steps—save valuable production time.

Engineered and designed with the famous 360° grip Prestole impression, Flat Nuts are available in a variety of standard types for immediate delivery to your plant production schedule. In addition, they can be designed and produced in many special sizes and shapes to meet specific requirements and applications.

In either case, they maintain their ability to meet severe torque and tensile requirements and distribute the fastening load over a larger area through Prestole's greater bearing surface. In thousands of applications, Prestole Flat Nuts continue to function long after other fastening methods have failed. Fastening problems of all types are being solved daily by Prestole's engineers and technicians. Consult your nearby representative or write direct to the factory for engineering assistance and service based on years of "know-how" in the fastenings industry.



PRESTOLE Corporation

1316 MIAMI STREET • TOLEDO 5, OHIO
PRESTOLE OF CANADA • OAKVILLE, ONTARIO

SEND ENGINEERING APPLICATION DATA . . .

TO:
Name_____
Company_____
Street_____
City_____ Zone____ State_____

FOR:
Application_____

den and unexpected stiffening of demand. No. 1 heavy melting climbed from $54 to $59, and No. 2 heavy melting from $52 to $57. No. 1 bundles advanced $5 to $58, while No. 2 bundles recovered from recent losses and advanced $2 to $40. Machine shop turnings showed a gain from $35 to $38. No. 1 cupola cast is quoted at $60, an increase of $2.

Seattle—Scrap prices have declined in this market. No. 1 heavy melting dropped from $56 to a range of $54 to $55, while No. 2 heavy melting dropped from $53 to $51. These declines are in line with recent changes in other areas. Mills have ample inventories and are restricting new purchases. Receipts by brokers are fair, but unfavorable weather in the interior has hampered collections. Export interests continue active.

Toronto, Ont.—Canadian scrap prices have dropped as much as $4 a ton. This is a decline of 7.4 per cent from the high point reached in December. No. 2 grades, which did not increase in the previous price jump, also declined. Canadian prices are now below levels of April, 1956. The latest decline follows drops in scrap prices in the U.S.

Pig Iron . . .

Pig Iron Prices, Page 152

The strike at the Woodward Iron Co., Birmingham, shows no signs of being settled soon. It has idled some 2500 workers for more than three months and has caused a tightening of pig iron supplies throughout the South. The deadlock in negotiations results from union proposals for a complete reclassification and re-evaluation of all jobs in the plant and an incentive pay plan in a three-year contract.

Pig iron business is sluffing off. This reflects lower operations at many foundries and their comfortable inventory positions. A number of shops in the East, for instance, are operating four days a week and have inventories sufficient for a full month's operations.

The Mystic Iron Works is shipping larger tonnages of iron from its stockpile at Everett, Mass. The strike cost this operator about 13,500 tons in January.

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Safety-Engineered for superior service...

U-W GOLD CLIPS

- Designed for rugged duty
- Wide range of sizes from ⅛" to 1¼"
- Conveniently packaged

The Gold Clip, an important addition to Upson-Walton's complete line of highest quality wire rope fittings, is setting a new standard for rugged, dependable service. U-bolt gold-chromate coated after galvanizing, your identification of top quality. All *Gold-Clips* are drop-forged from high grade forging steel.

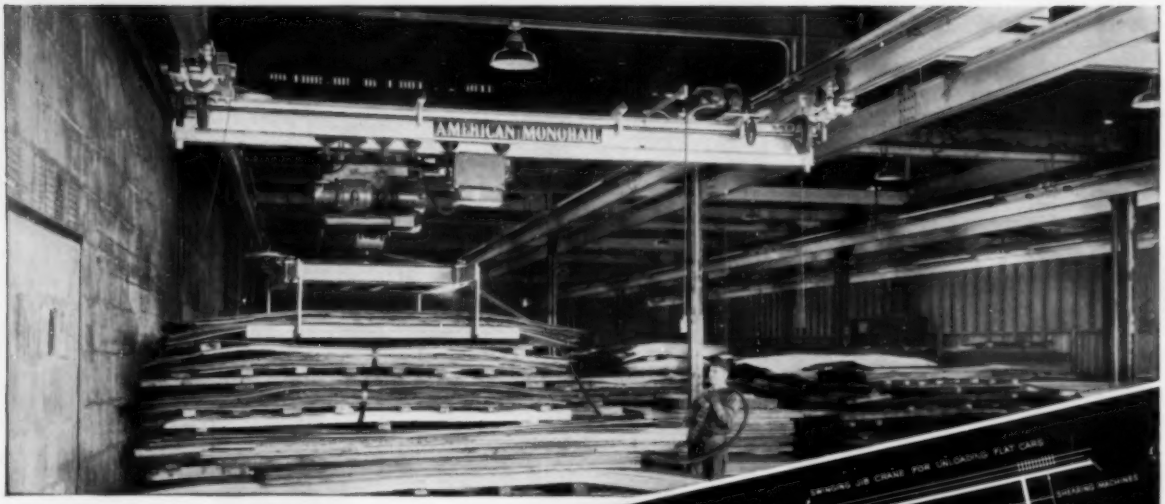
Available from stock in ⅛" through 1¼" sizes. Convenient packaging simplifies handling. See your nearby Upson-Walton distributor or write for complete details. The Upson-Walton Co., 12545 Elmwood Avenue, Cleveland 11, Ohio.

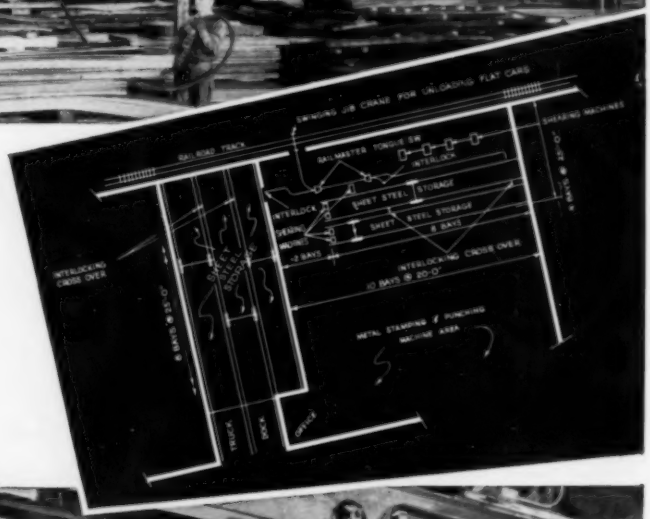
ENGINEERED FOR SAFETY

The
UPSON-WALTON
Company
SINCE 1871

Manufacturers of WIRE ROPE • ROPE FITTINGS • TACKLE BLOCKS • CRANE HOOK BLOCKS

Other offices: Chicago • New York • Pittsburgh





handles *200* tons more steel per day with

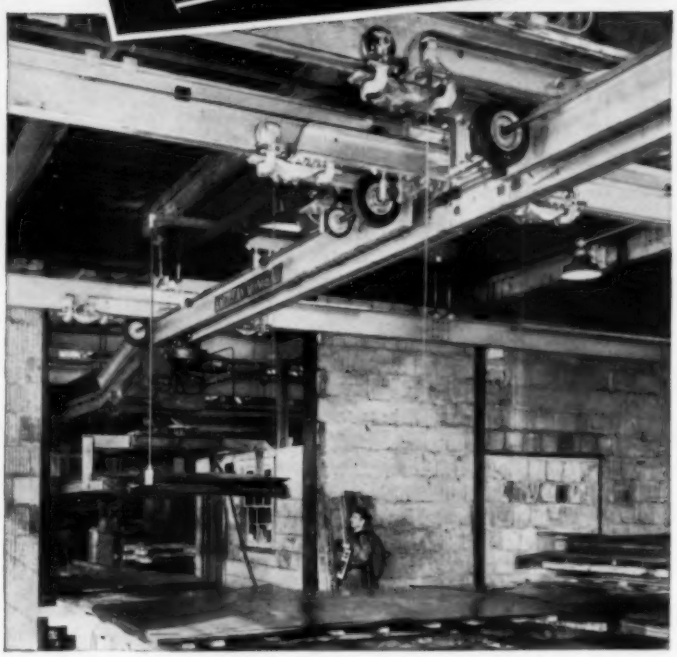
AMERICAN MONORAIL

The Hamilton Steel Products Company of Chicago now handles 250 tons of sheet steel per day with American MonoRail cranes as compared to 50 tons by previous methods. An increase of 400%.

This is just another example of cost savings with improved handling methods which are regularly realized by American MonoRail users. If you have a materials handling problem call your American MonoRail representative or write us today.

Send for Bulletin SC-1.

Member of Materials Handling Institute and MonoRail Association

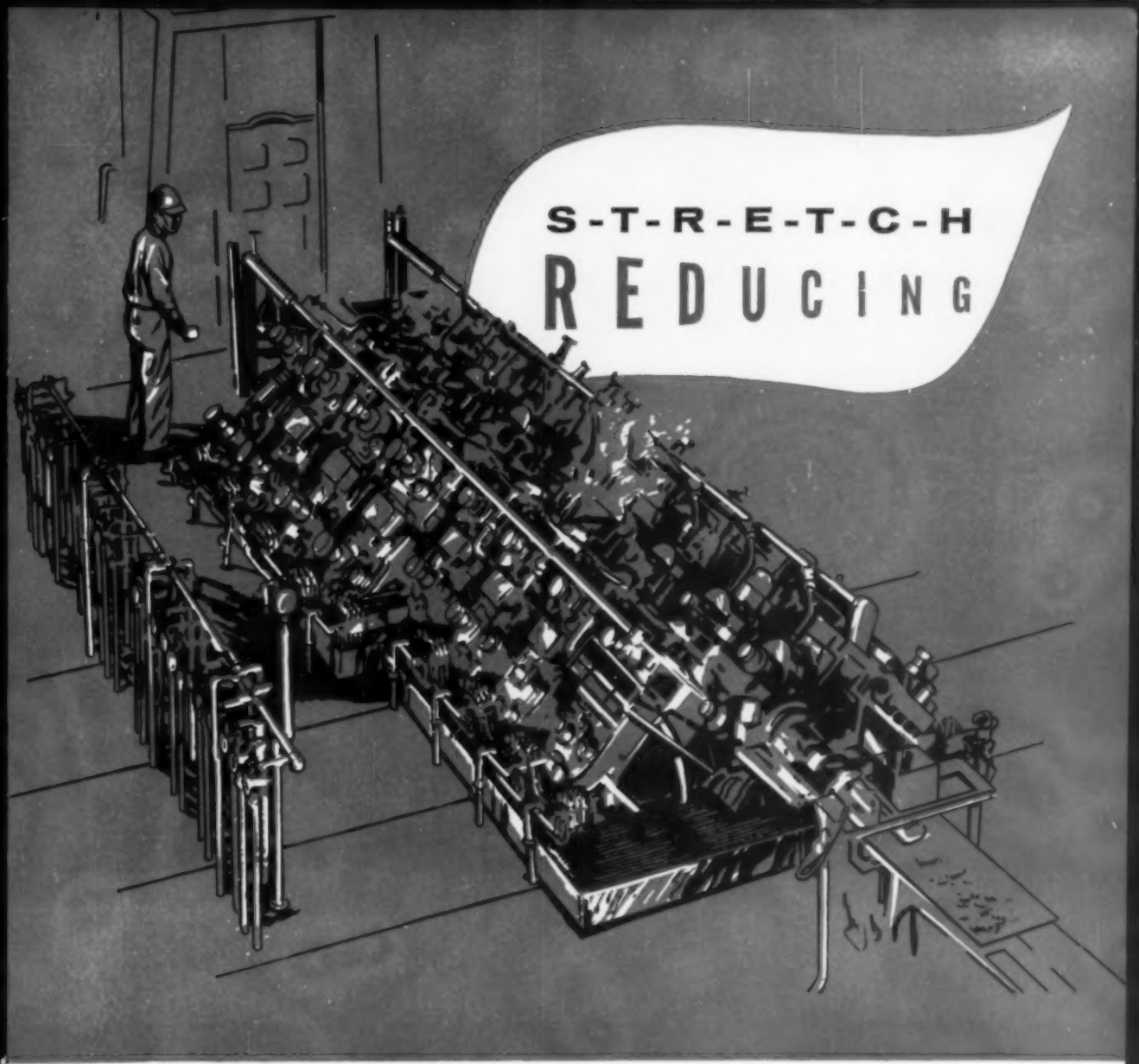


AMERICAN OVERHEAD HANDLING EQUIPMENT

MONORAIL COMPANY

13102 ATHENS AVENUE
CLEVELAND 7, OHIO

[IN CANADA—CANADIAN MONORAIL CO., LTD., GALT, ONT.]



● Much of the news in Seamless concerns the Stretch Reducing principle. The first such mill was installed by National Tube Division of U. S. Steel Corporation. Aetna-Standard collaborated with National Tube in designing this mill and supplying the equipment. Since that time, much development work has been done on the equipment and the process.

Chief advantage of the Stretch Reducing method is the resulting increase in tonnage from existing Seamless Tube Hot Mill equipment for the production of A. P. I. steel tubing. Briefly, tubes of the larger O. D. (6″ to 7″) are produced through the existing Piercer, Plug Mill and Reelers, thereby obtaining a maximum number of tubes at an increased tonnage per operating hour.

Aetna-Standard has built and is building most of the Stretch Reducing mills. If your group needs facts on cost, design, yield and other information, Aetna's Seamless engineers can help you.

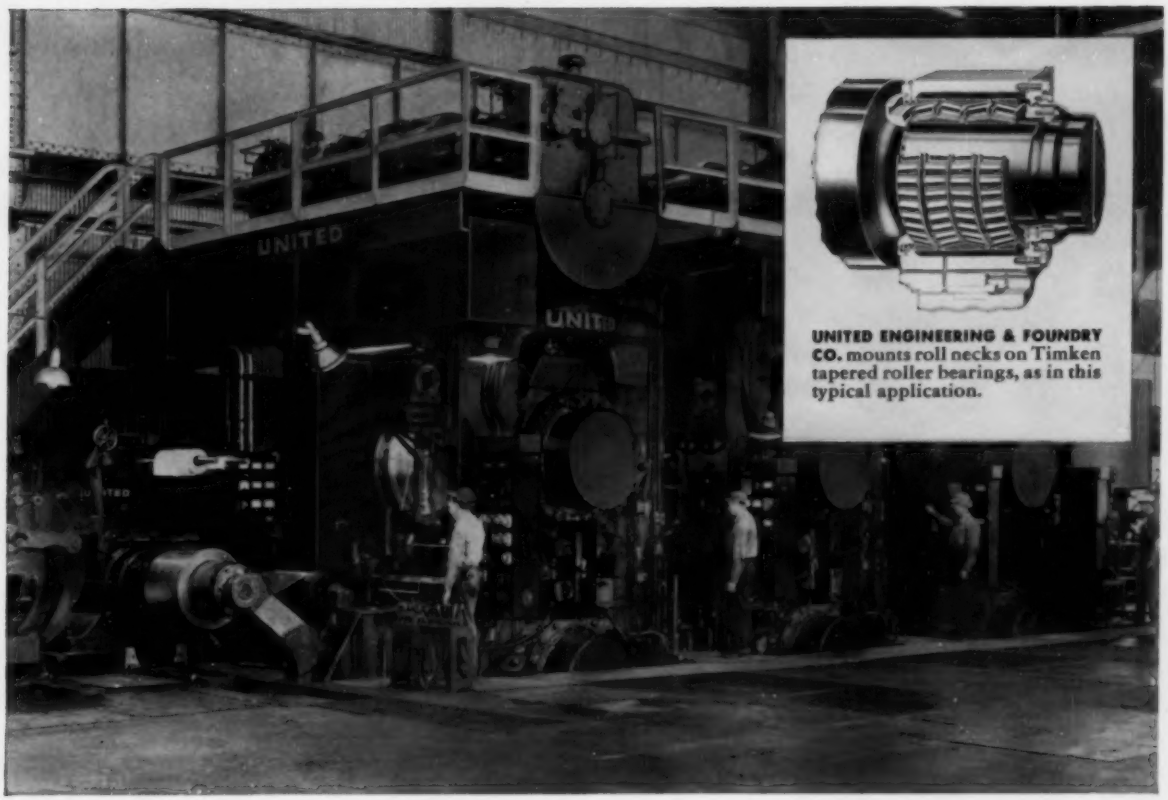
AETNA • STANDARD

THE AETNA-STANDARD ENGINEERING COMPANY

GENERAL OFFICES: PITTSBURGH, PA. **PLANTS: ELLWOOD CITY, PA., WARREN, OHIO**

CONTINUOUS GALVANIZING LINES • CONTINUOUS ELECTROLYTIC TINNING LINES • SIDE TRIMMING AND SHEAR LINES AND OTHER FINISHING EQUIPMENT • CONTINUOUS BUTT WELD PIPE MILLS • SEAMLESS TUBE MILLS • DRAWBENCHES AND OTHER COLD DRAW EQUIPMENT • ROLLS AND CASTINGS • EXTRUDERS, MILLS, PRESSES FOR RUBBER AND PLASTIC

Crucible Steel gets lower bearing cost per ton...less scrap loss per coil with roll necks on TIMKEN® bearings



UNITED ENGINEERING & FOUNDRY CO. mounts roll necks on Timken tapered roller bearings, as in this typical application.

UNITED ENGINEERING built this 3-stand tandem cold mill for Crucible Steel. Back-up rolls and work rolls are mounted on Timken® tapered roller bearings. By holding rolls rigid, Timken bearings assure "on-gauge" operation, cut costly scrap loss. And the long life of Timken bearings keeps bearing cost per ton of steel rolled to a minimum.

Tapered construction lets Timken bearings take radial and thrust loads. No extra thrust devices are needed. Chuck mountings are simpler, more compact. Timken bearings hold shafts, housings concentric — make closures more effective, with less lubricant leakage. Grease-lubricated Timken bearings require no tubes, pipes or reservoirs, reduce lubrication system maintenance costs. And rolls can be changed faster.

Geometrically designed and precision-made to give true rolling motion, Timken bearings permit easier acceleration, easier driving, which means a saving on power, reduced skidding and scuffing between rolls. Maintenance and repair costs are cut. Mills using balanced proportion Timken bearings increase roll neck strength up to 60% — load ratings up to 40%. The balanced proportion design permits large diameter roll necks without increasing bearing O.D., provides maximum capacity in less space.

Look for the trade-mark "Timken" on every bearing. The Timken Roller Bearing Company, Canton 6, Ohio. Canadian plant: St. Thomas, Ontario. Cable address: "TIMROSCO".

This symbol on a product means its bearings are the best.

TIMKEN TAPERED ROLLER BEARINGS ROLL THE LOAD

TRADE-MARK REG. U. S. PAT. OFF.